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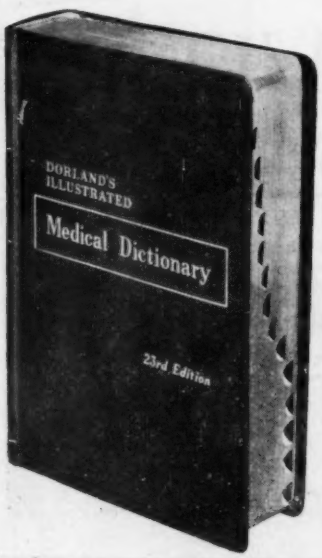

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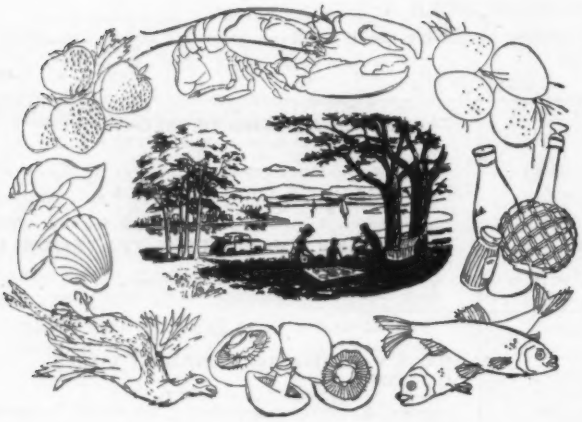

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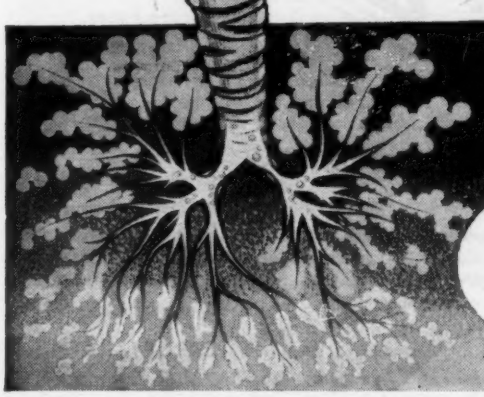

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MR. BINDER-SCOTT AND Dr. BERESFORD ENTER. THE DOOR CLOSES.

Dr. B: "Do you remember taking his appendix out, John? What did you find?"

Mr. B-S: "Nothing. I looked up the notes when you 'phoned. It was five years ago. Normal appendix - nothing to account for his pain then - probably nothing now, even if we did a laparotomy."

Dr. B: "There's nothing P.R. is there? I made sure of that."

Mr. B-S: "No. And the story has not changed. He's been having these bouts of pain in the R.I.F. for years.

Dr. B: "He's pretty fit really, you know. I don't feel inclined to subject him to barium enemas and so on. He's a funny chap. He doesn't like his work and I notice his pain always comes on at the library. What do you think of trying him on this new long-acting derivative of Oblivon — Oblivon-C?"

Mr. B-S: "By all means. If it works, we'll know the whole thing's psychogenic. If it doesn't, I can start some investigations for you. Let me know in a fortnight, will you?"

OBLIVON—C (Methylpentynol Carbamate)
is a product of British Schering Limited, Kensington High Street, London, W.8.

'Dettol' is active...

REGD.

against both Gram-positive and Gram-negative micro-organisms.

Under standard conditions of test a dilution of 1 in 200 kills Staph. aureus in 10 minutes; a 1 in 500 dilution kills Strep. pyogenes in 10 minutes, and a 1 in 250 dilution kills Bact. coli in 10 minutes.

'Dettol'—retains a high degree of efficiency in the presence of organic matter.

'Dettol'—is not incompatible with soap, traces of which need not be removed before application.

'Dettol'—is non-poisonous and non-staining.

'Dettol'—is well tolerated by the skin and tissues.

INSTRUMENT 'DETTOL'

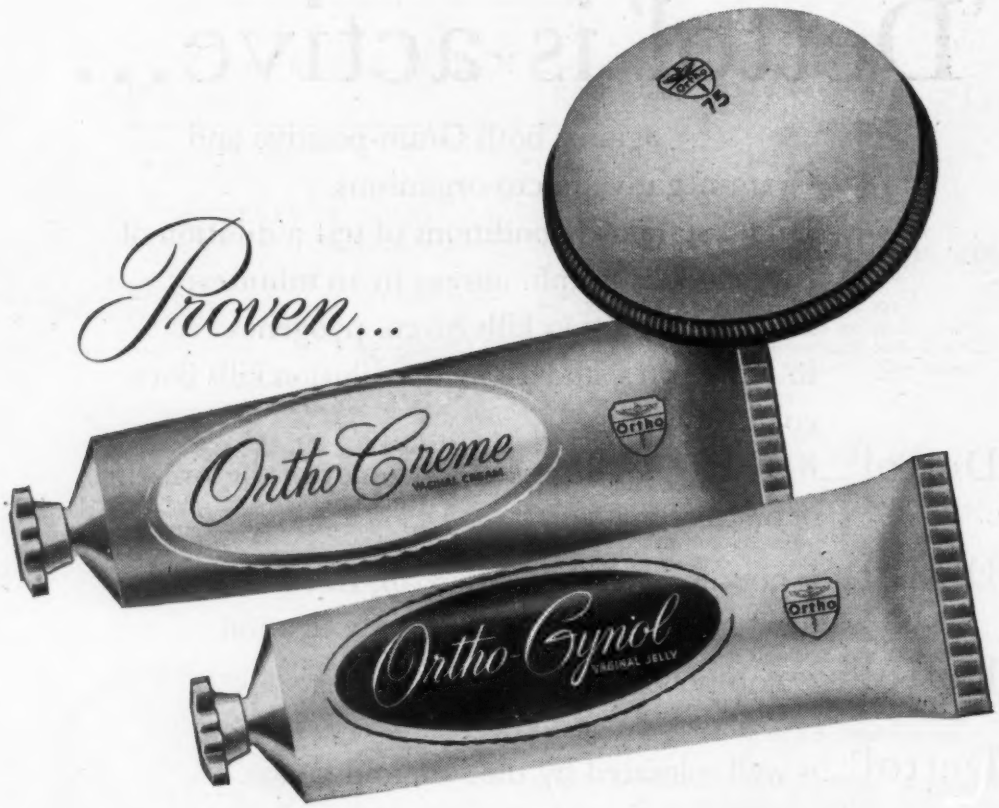
Instrument Dettol is widely used as a most effective and practical means of disinfecting surgical instruments—steel, stainless steel and plated, as well as glassware, rubber appliances and nylon sutures.

SURGICAL 'DETTOL'

Surgical Dettol is a specially formulated tincture for the surgical preparation of the skin. It remains actively bactericidal for a considerable period after drying. It dries quickly and leaves a non-slippery surface. Bactericidal action is not adversely affected by the use of ordinary soap solutions. Surgical Dettol in clinical use has proved non-toxic and non-irritant when used in accordance with the directions.

For leaflets giving full information on Instrument Dettol and Surgical Dettol

Please write to: RECKITT & COLMAN LTD., PHARMACEUTICAL DEPARTMENT, HULL.



...for dependable conception control

with the Ortho Diaphragm

Ortho

Ortho-Pharmaceutical Limited · High Wycombe · England

"The one drug which has proved the test of time as a basic constituent of any air sickness remedy is undoubtedly Hyoscine hydrobromide"

—Extract from an article in THE PRACTITIONER May. 1957—"Prevention and Treatment of Air Sickness" P.627

Hyoscine Hydrobromide is the basic constituent of

Kwells

PROFESSIONAL SAMPLES ON REQUEST. MANUFACTURED BY E. GRIFFITHS HUGHES LTD., MANCHESTER. 1/6 FOR 10 TABLETS

that is why

Maw's Nadecon is the preferred prescription. It permits the employment of Menthol in significant concentration and in an aqueous form.

Maw's Nadecon is indicated for the local treatment of catarrhal conditions of the upper respiratory tract. It gives immediate relief and comfort to the patient through increased ventilation with improved drainage from the infected paranasal sinuses. It establishes a pH unfavourable to bacterial development, together with conditions complementary to natural processes of recovery. When instilled into the nostrils the transient awareness of Nadecon serves to restrict excessive dosage. It is suitable for both Adult and Child patients.

Freely prescribable on EC.10 (Category 3/4)

presents MENTHOL *in an aqueous vehicle*

Maw's **Nadecon** Nasal Decongestant

FORMULA	*%W/V*
Menthol	*0.25*
Pseudoephedrine HCl	*0.99*
Chlorbutol	*0.25*
Aqueous Vehicle	*to 100*

S. Maw Son and Sons Limited · Barnet · England G449

The first

Water

soluble

chloramphenicol

By preparing the water-soluble sodium salt of chloramphenicol succinic ester CARLO ERBA have finally solved the therapeutic problem of parenteral (*intramuscular, intravenous, intraspinal*) and topical (*aerosol, intrabronchial, intrapleural,* etc.) administration of this antibiotic.

KEMICETINE

Succinate

CARLO ERBA MILANO

CARLO ERBA MILANO

When fluid contents exceed requirements

DIAMOX*

REGD. TRADEMARK ACETAZOLAMIDE

Lederle

In conditions where excess fluid accumulates in body tissues, prompt dispersal measures are called for. In such cases, by inhibiting carbonic anhydrase, DIAMOX acetazolamide produces prompt copious diuresis. It has proved its ability to control body-fluid balance in cardiac oedema, glaucoma and epilepsy. Published reports also show satisfactory results from DIAMOX in toxaemia and oedema of pregnancy, premenstrual tension, renal oedema, emphysema and drug-induced oedema. DIAMOX is a welcome departure from the mercurials and is well suited to long-term maintenance of ambulant and out-patient cases.

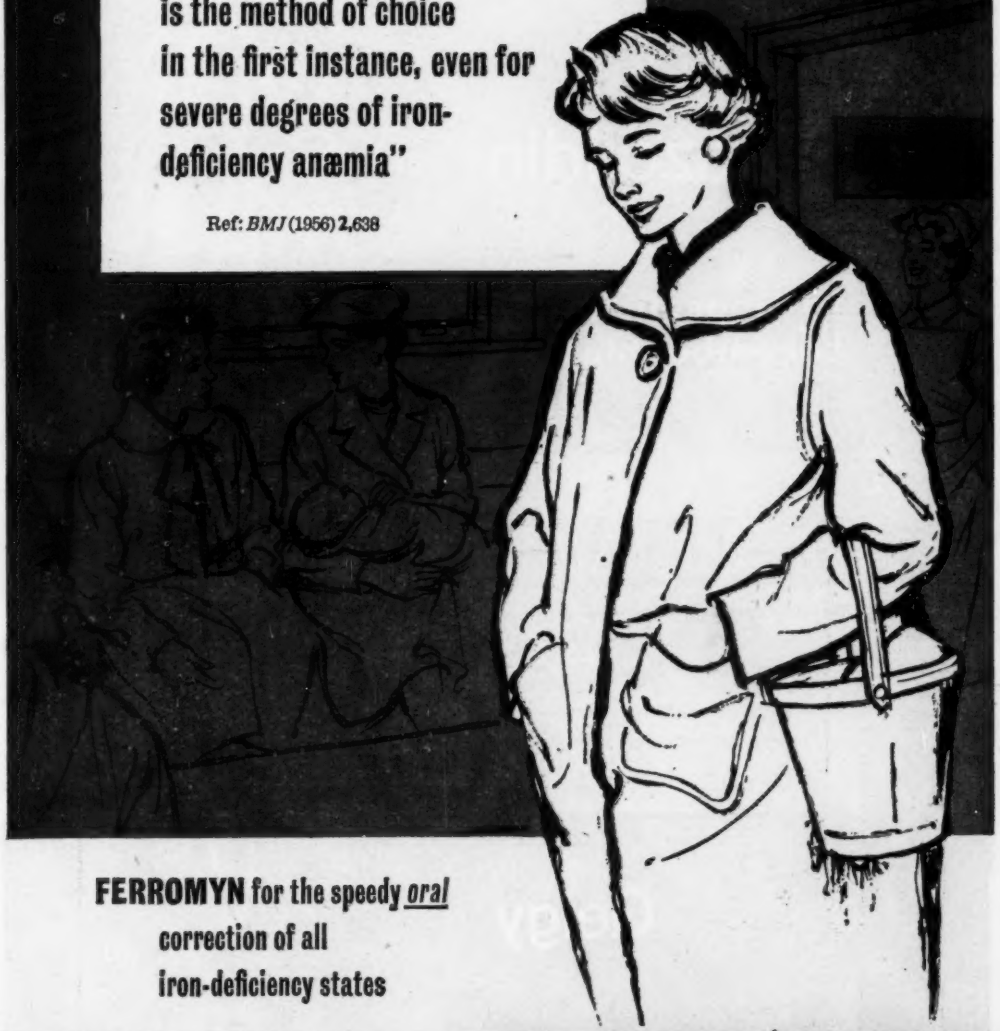
TABLETS of 250 mg.
Bottles of 25, 100 and 1000

PARENTERAL Vials of 500 mg.

LEDERLE LABORATORIES DIVISION
Cyanamid OF GREAT BRITAIN LTD., London, W.C.2

"... and unless the patient is very near term, this (FERROMYN 1 t.d.s.) is the method of choice in the first instance, even for severe degrees of iron-deficiency anæmia"

Ref: *BMJ* (1956) 2,638



FERROMYN for the speedy *oral* correction of all iron-deficiency states

FERROMYN *is presented in four forms:*
FERROMYN TABLETS AND FERROMYN ELIXIR.
Each tablet/teaspoonful contains: *Ferrous Succinate 150 mg.*
FERROMYN 'B' TABLETS AND ELIXIR FERROMYN 'B'.
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FERROMYN

CALMIC LIMITED, CREWE. *Phone CREWE 3251-5* **LONDON:** *2 Mansfield St., W.1. Phone LANgham 8038-9*

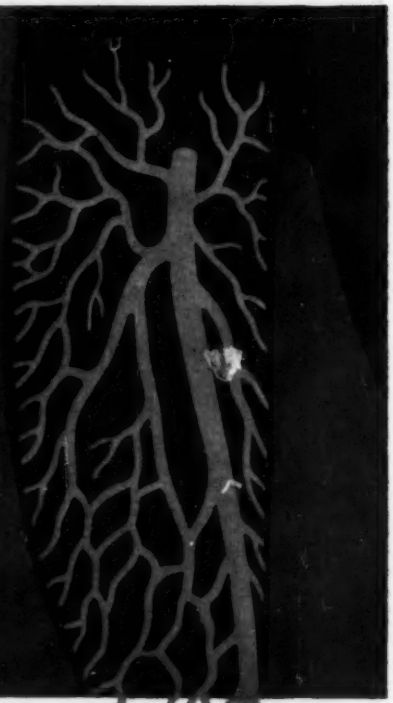
AUSTRALIA: 456-468 Wattle Street, Ultimo, Sydney, N.S.W. **CANADA:** Terminal Building, York St., Toronto.

F5

Butazolidin

REGD. TRADE MARK

In Superficial thrombophlebitis



Butazolidin's outstanding reputation in the treatment of rheumatic disorders should not overshadow its value in rapidly relieving pain and swelling and in restoring normal temperature in superficial thrombophlebitis.

It is rarely necessary for treatment to last more than one week.

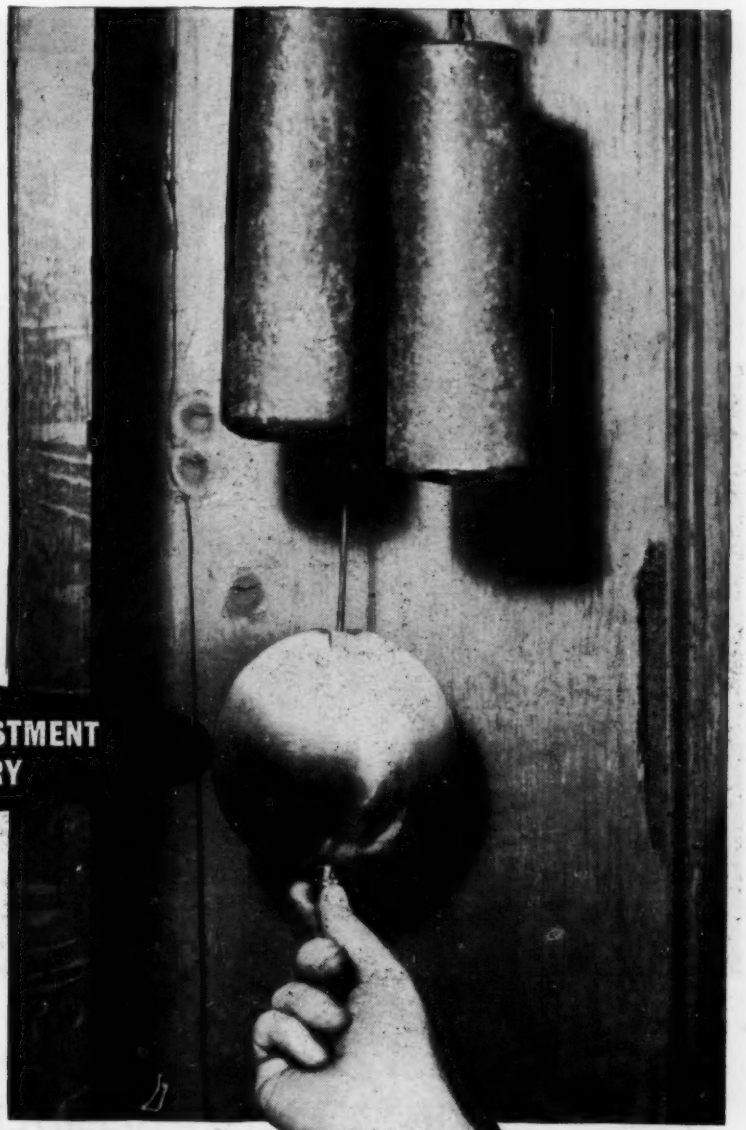
Geigy

Detailed literature is available on request.

Geigy Pharmaceutical Company Ltd., Wythenshawe, Manchester, 23

16

PH.103



WHEN ADJUSTMENT
IS NECESSARY

OROVITE

High dosage Vitamin B complex for rapid restoration of Intracellular Metabolism

The realization that vitamins of the B complex are co-enzymes in intracellular oxidations and phosphorylations has led to their use in high doses. Only by a raised concentration of these factors within the cell can disordered metabolic exchanges be rapidly restored to normal. Hence Orovite—elixir and tablets.

PARENTROVITE:
Massive dose of injectable B complex with vitamin C for restoring consciousness and rational behaviour in toxic states due to drugs and infective agents.

BECOVITE & BEFORTISS:
Two groups of preparations for intensive and maintenance therapy—combining the vitamin B complex in less massive concentrations.

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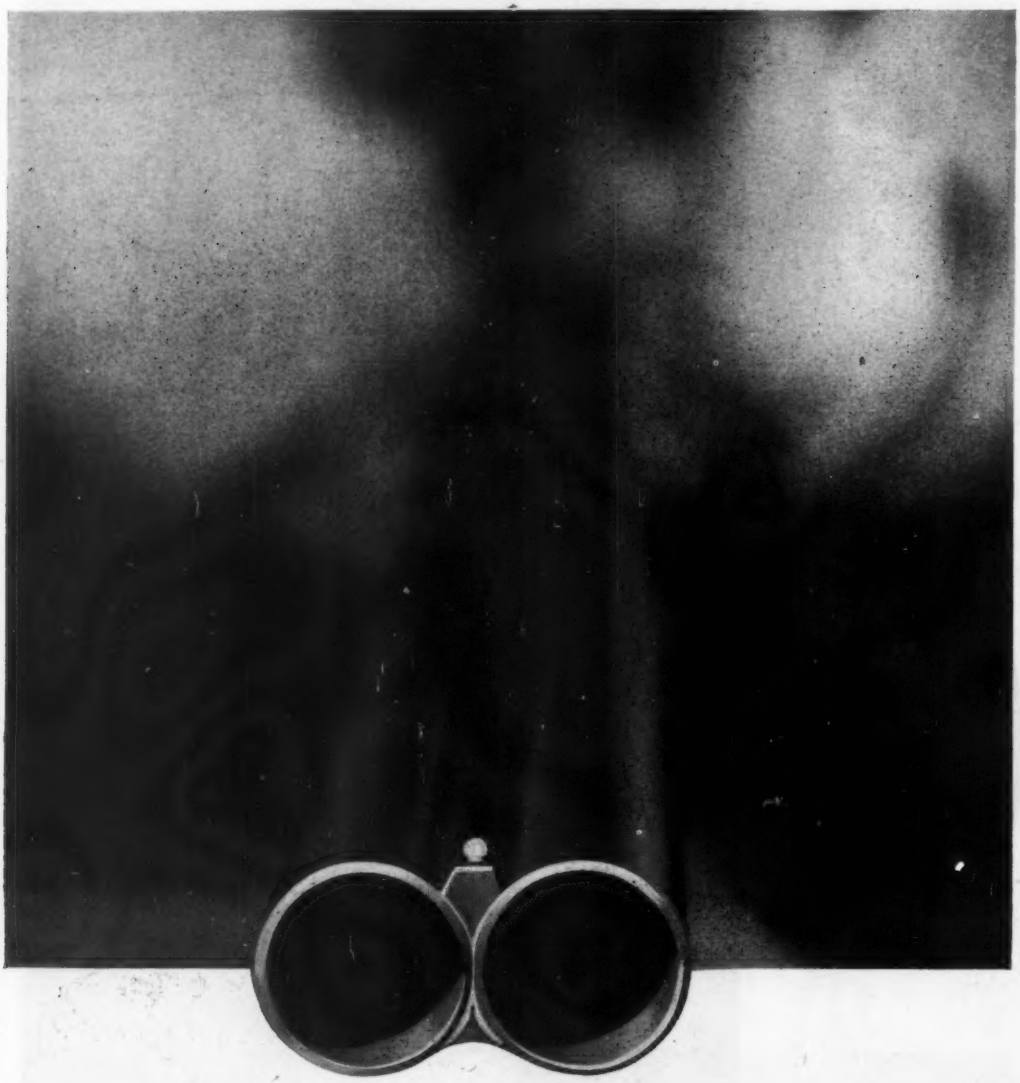


Why you need two barrels

THE TWO active ingredients in 'Sulmezil' V are together much more lethal to bacteria than either alone.

One ingredient is penicillin V, the acid stable form of penicillin which is rapidly and efficiently absorbed and gives consistent and reliable blood levels. This form of penicillin has proved to be markedly superior in these respects to other oral penicillin preparations.

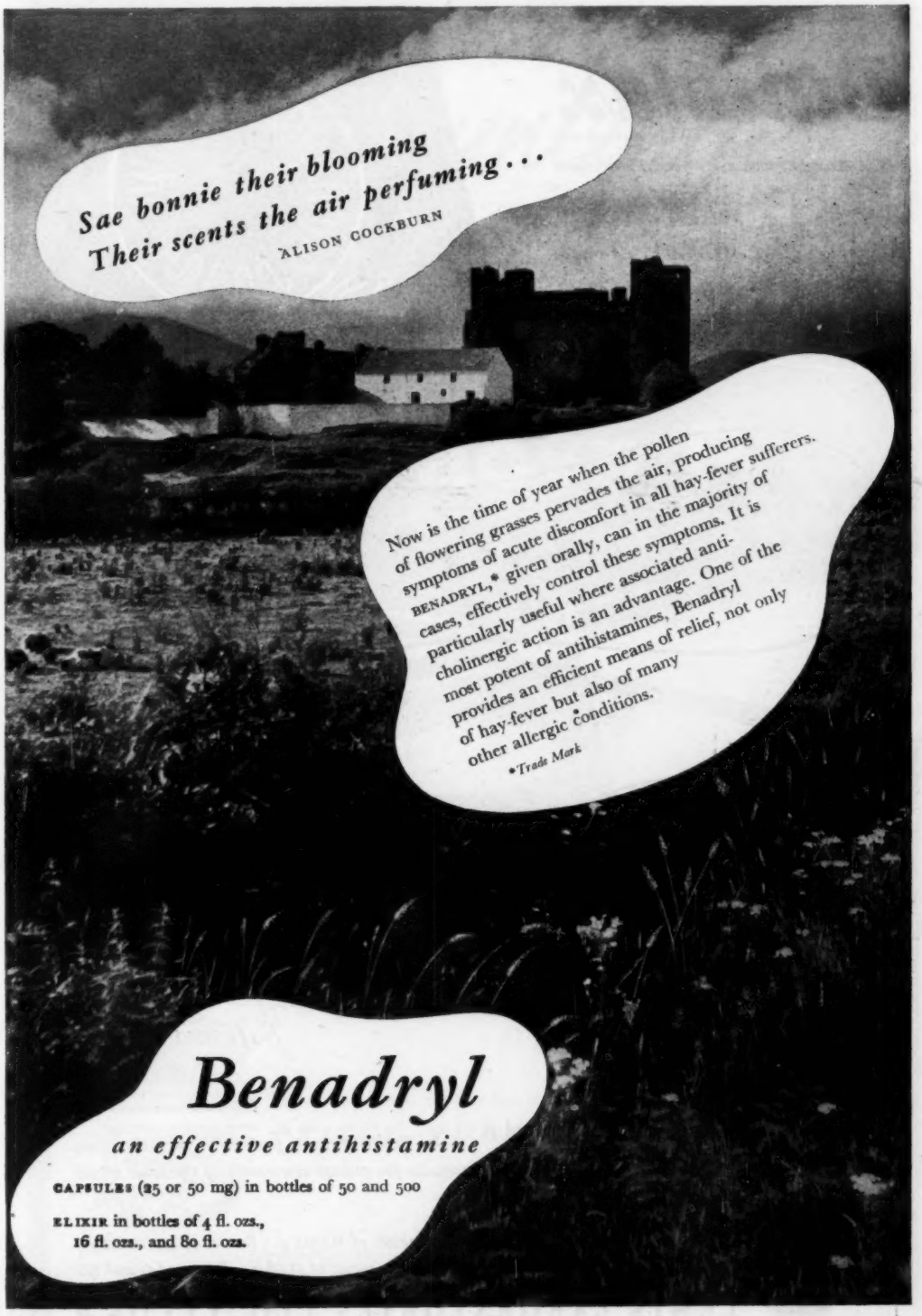
Combined with penicillin V is 'Sulphamezathine', which has been widely accepted for many years on account of its high potency coupled with low toxicity. It is undoubtedly the best sulphonamide for routine use.

'Sulmezil' V tablets present these two drugs in a single easily-administered form. Each tablet contains 60 mg. of penicillin V (Calcium Salt) and 0.5 g. of 'Sulphamezathine'. In packs of 25, 100 and 500.

'Sulmezil' V tablets

IMPERIAL CHEMICAL INDUSTRIES LIMITED Pharmaceuticals Division Wilmslow Cheshire

Ph.740


Sae bonnie their blooming
Their scents the air perfuming . . .
ALISON COCKBURN
Now is the time of year when the pollen of flowering grasses pervades the air, producing symptoms of acute discomfort in all hay-fever sufferers. BENADRYL,* given orally, can in the majority of cases, effectively control these symptoms. It is particularly useful where associated anti-cholinergic action is an advantage. One of the most potent of antihistamines, Benadryl provides an efficient means of relief, not only of hay-fever but also of many other allergic conditions.
*Trade Mark
Benadryl
an effective antihistamine
CAPSULES (25 or 50 mg) in bottles of 50 and 500
ELIXIR in bottles of 4 fl. ozs., 16 fl. ozs., and 80 fl. ozs.

PARKE, DAVIS & CO. LTD., *(Inc. U.S.A.)* HOUNSLOW · MIDDLESEX. *Telephone: Hounslow 2361*

489

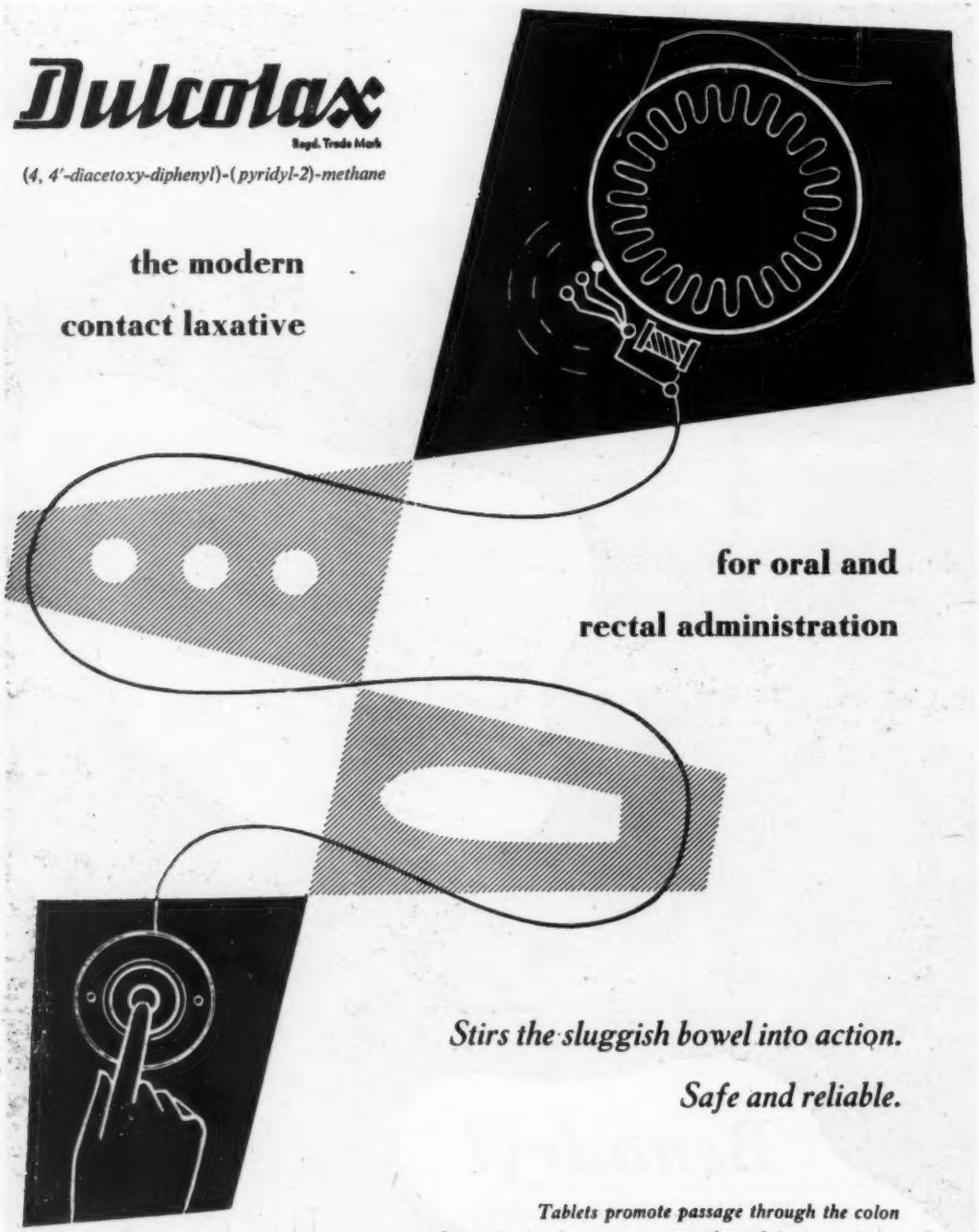
Dulcolax

Regd. Trade Mark

(4, 4'-diacetoxy-diphenyl)-(pyridyl-2)-methane

the modern

contact laxative



for oral and

rectal administration

Stirs the sluggish bowel into action.

Safe and reliable.

Tablets promote passage through the colon
Suppositories for prompt evacuation of the lower bowel

Dulcolax enteric coated tablets of 0.005 g. · Bottles of 30 and 200
Dulcolax suppositories of 0.01 g. · Boxes of 6 and 50

LEWIS LABORATORIES LTD., LEEDS 9

Announcing

Tetracyn* P

TETRACYCLINE (PHOSPHATE BUFFERED)

Routine laboratory tests and clinical experience have shown that the addition of phosphate to tetracycline results in higher serum concentrations and high urinary level following oral administration. Tetracyn 'P' capsules contain 250 mg. tetracycline and 380 mg. sodium metaphosphate and are available in bottles of 16 and 100.

Sandwich — Manufacture of Raw Materials

PFIZER PHARMACEUTICALS

Folkestone — Processing of tablets, injections, etc.

Pfizer

Manufactured and Processed at

SANDWICH AND FOLKESTONE, KENT

* *Trade Mark of Chas. Pfizer & Co., Inc.*

the long-acting antihistamine

HISTRYL SPANSULE

night and day relief from allergic symptoms

with just one capsule q12h

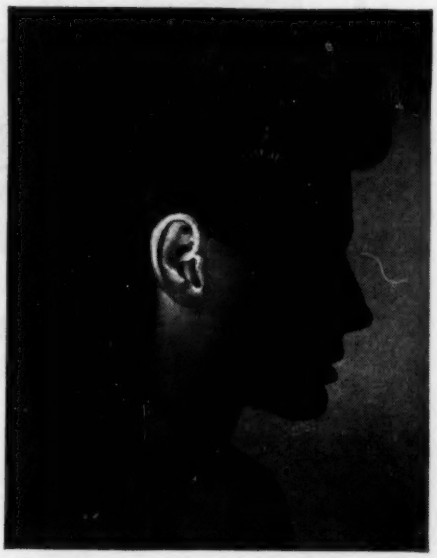
Smith Kline & French Laboratories Ltd Coldharbour Lane, London SE5

'Histryl' and 'Spansule' are trade marks *Brit. Pat. No. 742007*

SH:PA127

EAR WAX

Removed this easy way



The removal of wax from the external auditory meatus has, in the past, normally entailed attendance by the patient for diagnosis and for the prescription of a suitable loosening agent, and a second attendance a few days later for syringing. Now, by the use of Cerumol Ear Drops, wax can be removed in most cases at one visit. A few drops of Cerumol can be instilled into the ear and, while another patient is being attended to, the soft cerumen dissolves and the harder wax disimpacts. The wax can then be removed by gentle syringing or with cotton wool. The wax may even be found to run out of the ear on its own accord, in which case patients themselves may instil Cerumol at home, obviating further attendances. Cerumol is anti-bacterial, non-irritating and harmless to the lining of the external auditory meatus or the tympanic membrane. Cerumol is included in Category No. 4 of the M.O.H. classified list and may be prescribed on N.H.S. Form E.C.10.

CERUMOL
Regd TRADE MARK

EAR DROPS

for the easier removal of wax

If you wish to test for yourself and have not received recently a 10 c.c. vial please write or telephone direct to :

LABORATORIES FOR APPLIED BIOLOGY LIMITED,
91, AMHURST PARK, LONDON, N.16 Telephone STAmford Hill 2252

PACKS for Surgery Use : 10 c.c. vial — separate dropper included. (Basic N.H.S. price 2/8.) For Hospital Use : 2 oz. and 10 oz. bottles.

GRAND MAL EPILEPSY

"... a state produced by intense, spontaneous neuronal activity which has a tendency to spread throughout the grey matter of the brain with unbridled augmentation ... like a prairie fire"

W. Penfield.

EPANUTIN* (phenytoin sodium) offers four epileptics out of five the opportunity of leading normal lives. The control of seizures by this powerful anticonvulsant is achieved with negligible hypnotic effects, and is frequently accompanied by improved psychological outlook and mental alertness. Some cases of *grand mal* respond better to a combination of Epanutin and Phenobarbitone than to either of these drugs given separately.

* Trade Mark

EPANUTIN

anticonvulsant with minimal hypnotic action

Epanutin Capsules (1½ grs. and ½ gr.) bottles of 100 and tins of 1,000.

Epanutin and Phenobarbitone Capsules. Each capsule contains 1½ grs. Epanutin and ½ gr. Phenobarbitone. Bottles of 100 and tins of 1,000.

Epanutin Suspension. Each 4 m³. (one teaspoonful) contains 100mg. (1½ grs.) of diphenylhydantoin. Bottles of 4, 16, and 80 fl.ozs.

PARKE, DAVIS & COMPANY, LTD. *(Inc. U.S.A.)* HOUNSLOW, MIDDX. Tel: Hounslow 2361

32

Summer Bane

Hay Fever brings misery and discomfort to thousands at this time of the year. Pabracort Insufflations have proved their value in the control of Hay Fever both by clinical trial and in general practice. Dramatic relief is usually obtained within two or three days and complete alleviation after two weeks treatment. Each insufflation capsule contains 15 mg. hydrocortisone acetate in a specially prepared snuff base (micronized)

Reference: Lancet (1956) i., 537

PABRACORT

INSUFFLATIONS

Packings: Pabracort outfit (10 capsules and insufflator)
Capsules 10, 25, 100

PAINES AND BYRNE LTD., PABYRN LABORATORIES, GREENFORD, MIDDX.

25

with

ACHROM

TETRACYCLINE BUFFERED WITH SODIUM METAPHOSPHA

Absorption is faster . . . bloo

ACHROMYCIN V is Lederle's latest contribution to medical science. It results from intensive research on methods of increasing the therapeutic potency of ACHROMYCIN tetracycline—already recognised as today's foremost self-sufficient broad-spectrum antibiotic. ACHROMYCIN V consists of ACHROMYCIN tetracycline buffered with sodium metaphosphate—believed to have the ability of binding certain metal ions present in the intestinal tract, which, when free, combine with some of the tetracycline and prevent its absorption. ACHROMYCIN V is now available to doctors who want the maximum bene from oral therapy with ACHROMYCIN.

Initial clinical investigations show t ACHROMYCIN V possesses all the ackn ledged clinical virtues of ACHROM tetracycline plus the following advanta

It is more rapidly absorbed from the intestinal tract;

It provides higher blood levels of tetracycline more rapidly;

The high tetracycline levels attai with ACHROMYCIN V are noticeable e within the first hour or two after ministration.

LEDERLE LABORATORIES DIVISIO

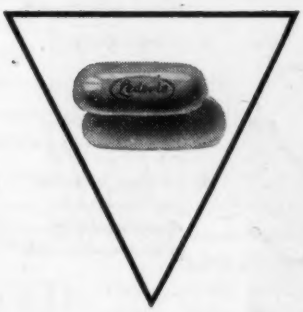
V

YCIN

levels higher

ACHROMYCIN V can be used for the same wide range of infections for which ACHROMYCIN tetracycline has been employed. SUGGESTED DOSAGE: As for ACHROMYCIN, i.e. for the average adult, 1 Gm. DAILY in divided doses.

ACHROMYCIN V is presented in capsules containing 250 mg. ACHROMYCIN tetracycline, and 380 mg. Sodium Metaphosphate.



Bottles of 16, 100 and 1,000 Capsules.

*Regd. Trademark.

50 CYANAMID 1907 1957

CYANAMID OF GREAT BRITAIN LTD., LONDON, W.C.2

PENTOXYLON

COMPREHENSIVE THERAPY FOR ANGINA PECTORIS

- **Prevents coronary spasm**
- **Averts attacks**
- **Dispels fear**

PENTOXYLON

* *reduces nitro-glycerin requirements.*

* *reduces severity of attacks.*

* *reduces incidence of attacks.*

* *reduces tachycardia.*

* *reduces anxiety, allays apprehension.*

* *reduces blood-pressure in hypertension.*

* *increases exercise tolerance.*

* *produces objective improvement demonstrable by electro-cardiograph.*

It is recognised that complete angina therapy should not only relieve the coronary spasm, but should help to prevent attacks. This has been accomplished by 'Pentoxylon' to a considerable degree. 'Pentoxylon' combines the benefits of two powerful and reliable agents — 'Rauwiloid' and P.E.T.N. 'Rauwiloid', an alkaloidal extract of *Rauwolfia serpentina*, has bradycardic, tranquillising and stress-relieving properties, and stabilises the patient emotionally. P.E.T.N. produces a long-sustained dilatation of the coronary blood vessels, so improving the circulation to the myocardium, reducing the severity of attacks when they occur. The dual action of 'Pentoxylon' provides a more comprehensive . . . more effective . . . therapy than has hitherto been possible using a single medicament, and it infuses the anginal patient with a feeling of well-being and hope.

Each 'Pentoxylon' tablet contains 1mg. 'Rauwiloid' and 10mg. pentaerythrityl tetranitrate. The usual dosage is one tablet four times daily *before* meals. Occasionally it is desirable to increase the dosage — up to 8 tablets daily are well tolerated.

RIKER

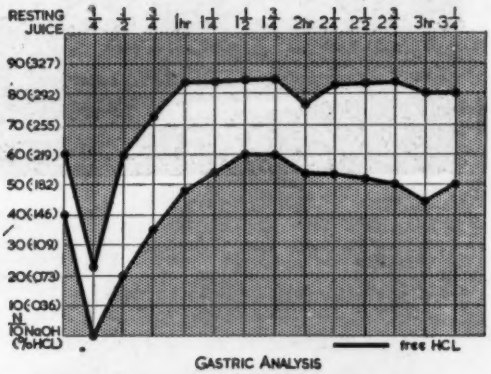
'Pentoxylon' is a regd. trademark. Regd. users: RIKER LABORATORIES LIMITED LOUGHBOROUGH LEICS.

"an approach to the ideal is provided by a slowly dissolving antacid tablet which is lodged between the gum and cheek. Thus, with each act of swallowing, alkali is carried down over the gullet to the stomach. It is remarkable how little is the quantity needed to depress effectively the concentration (pH) of gastric HCl. The first such tablet ('nulacin')...."

Practitioner, January, 1957.

NULACIN THERAPY

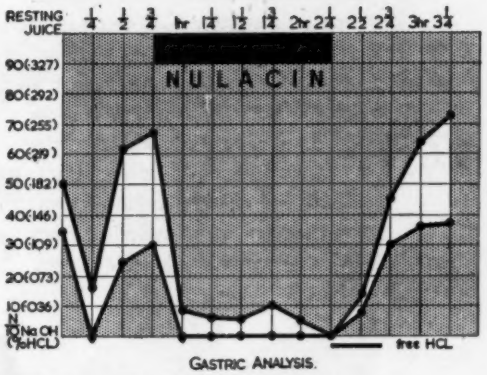
—Simple, safe, effective



GASTRIC ANALYSIS

A Nulacin tablet effectively depresses the concentration of gastric HCl in peptic ulcer and other conditions of hyperacidity. It also provides protection against gastric HCl to the otherwise unprotected oesophageal wall and in such conditions as oesophagitis and hiatus hernia.

SUPPLY. Nulacin tablets may be prescribed on E.C.10. The dispensing pack of 25 tablets is free of Purchase Tax. (Basic price to N.H.S.: 2/-). Also available in tubes of 12.



GASTRIC ANALYSIS.

HORLICKS LIMITED *Pharmaceutical Division, Slough, Bucks., England*

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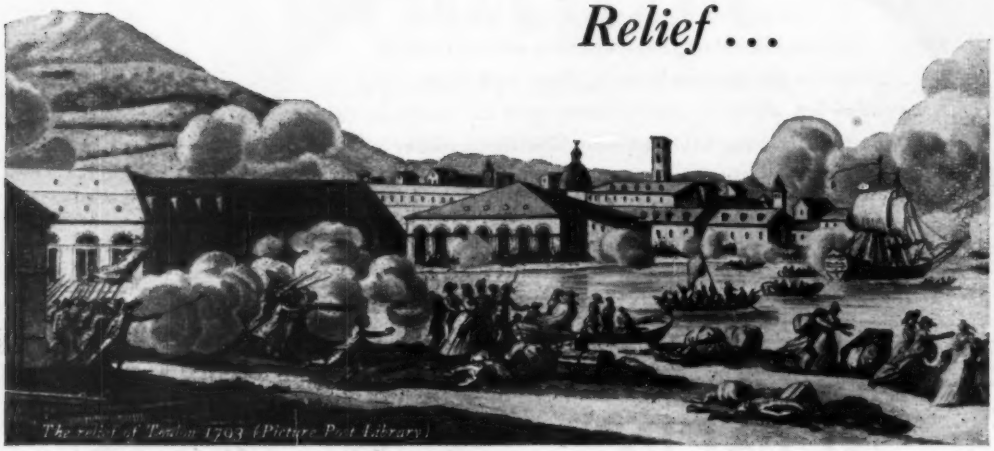
Relief ...



from the agony of spasm

Gastric and duodenal ulcer, spastic dysmenorrhœa, renal and biliary colic, these and many other painful spastic conditions will respond to the rapid, smooth action of BUSCOPAN. BUSCOPAN is a spasmolytic with a specific point of attack having an effect upon the hollow organs of the abdomen and genito-urinary tract. Safe and effective in all its uses, BUSCOPAN is virtually free from atropine-like side effects.

*BUSCOPAN**

HYOSCINE-N-BUTYLBROMIDE

INGELHEIM

Manufactured and distributed in England by Pfizer Ltd., Folkestone, Kent, for

C. H. Boehringer Sohn, Ingelheim am Rhein

Registered proprietors of the Trade Mark. * *Regd. Trade Mark*

For allergic conditions in children....

NEW

Sandosten★ Syrup

(with Calcium-Sandoz)

★ *Regd. Trade Mark for thenalidine, an antihistamine*

Bottles of 7 fl. oz. Basic N.H.S. price: 7/-

SANDOZ PRODUCTS LIMITED, LONDON W.1

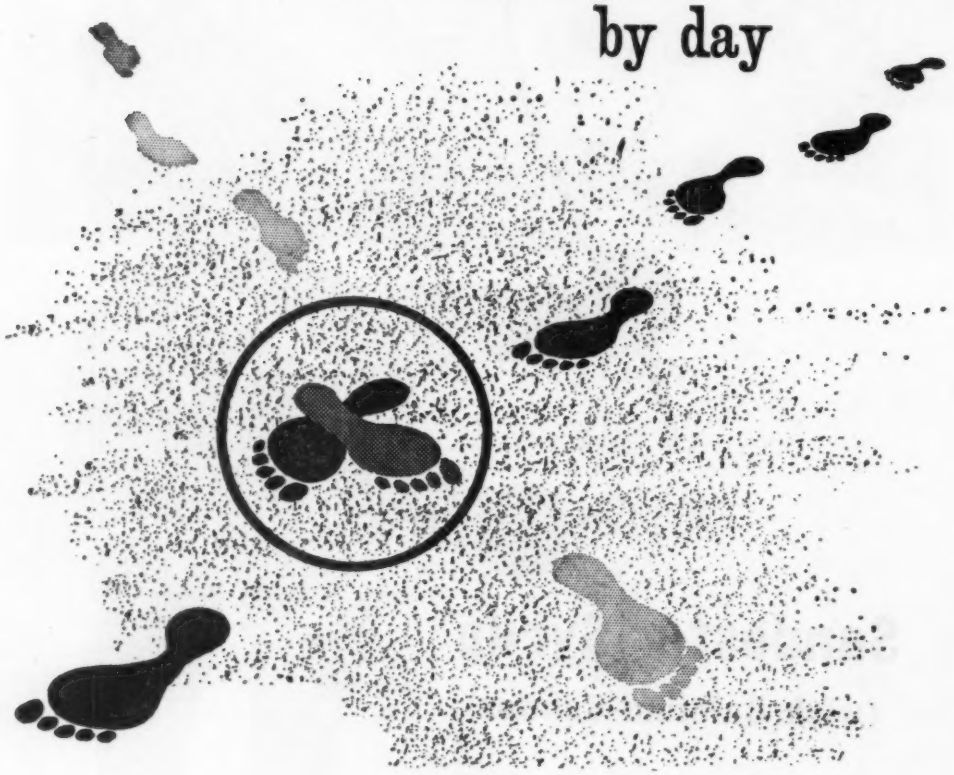
AA 31

'ASTEROL'

For TINEA PEDIS

TINCTURE supplemented
by **POWDER** for dusting
into socks and stockings

by day



and **OINTMENT**

at night

Packings: ASTEROL TINCTURE (5 per cent) is available in bottles of 30 c.c. and 250 c.c.
ASTEROL OINTMENT (5 per cent) is available in tubes of 25 g.
ASTEROL POWDER (5 per cent) is available in tins of 30 g.

ROCHE PRODUCTS LIMITED · 15 MANCHESTER SQUARE · LONDON · W.1

32

Introducing

Calcipen-V

CALCIUM-**PENICILLIN V**

the most efficient

oral penicillin

Calcipen-V is the calcium salt of **Penicillin V** and offers the following advantages in oral penicillin therapy:

rapid onset of action **reliable absorption**

sustained blood levels on 4 to 6 hourly dosage

Calcipen-V

Tablets of 60 mg. **Penicillin V** (as calcium salt). Bottles of 20, 100, 500.
Tablets of 120 mg. **Penicillin V** (as calcium salt). Bottles of 20, 100, 500.

Detailed literature will be gladly sent on request

BOOTS PURE DRUG CO. LTD., NOTTINGHAM, ENGLAND

Boots

8270

3 essentials to sound clinical IRON replacement

In post-haemorrhagic states; as a therapeutic or precautionary measure during and after pregnancy; in adolescents, old people and those of unsound dietary habits, Ferraplex B is ideal for iron-deficiency anaemias of all kinds.

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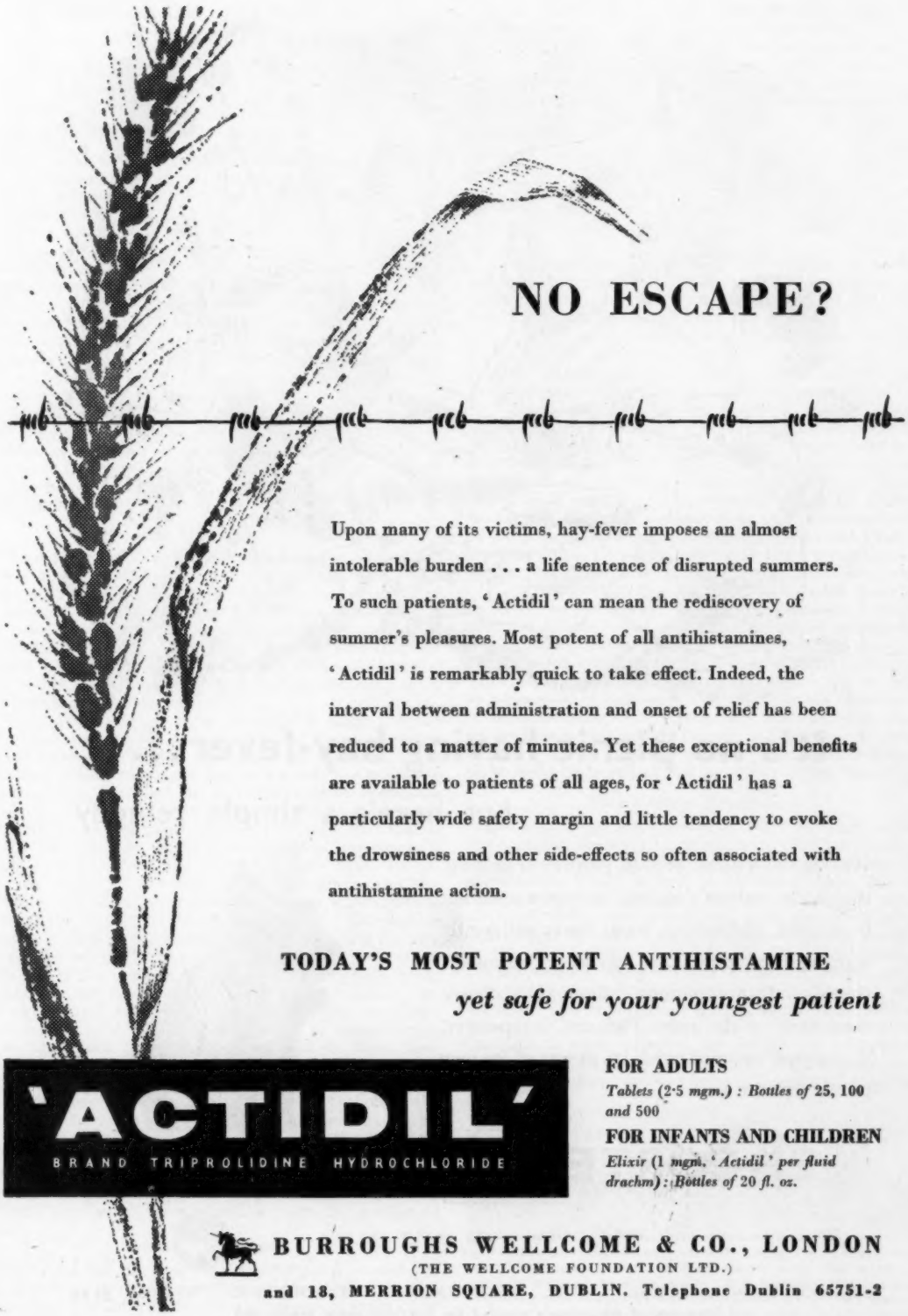

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MECHANICAL FACTORS IN ATHEROSCLEROSIS

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THE question of diet in atherosclerosis has occupied so much attention in recent years that the mechanical factors recognised by the older writers seem almost to have been forgotten.

More than thirty years ago one of us (Duguid 1926) wrote emphasising the importance of taking functional activity into account in interpreting arterial lesions, and suggesting that atheroma (as it was then called) represented a form of mechanical injury brought about by the discordant movements which followed loss of elasticity of the intima. Of late we have been concerned with the thrombogenic hypothesis in relation to atherosclerosis, but we have seen nothing to make us wish to modify the mechanical one put forward in 1926. On the contrary, we have found evidence to support it, and are more than ever convinced that there can be no clear understanding of atherosclerosis until the mechanical factors concerned in arterial function are taken into account. The mechanical hypothesis and the thrombogenic are complementary and should be considered in conjunction.

Functional Activity of Arteries

The mechanical hypothesis is based on the assumption that the aorta and larger arteries dilate and recoil with each pulse beat. This, we must admit, has been called in question. It has been stated that the arteries, except the aorta, are kept at an even calibre by contraction of their medial muscle. Though we do not believe that this view is widely held, we feel that it has to be considered, if only to bring out certain points which have a bearing on the distribution of the lesions.

When a volume of blood is expelled from the left ventricle at systole, the aorta must dilate to accommodate it, and so to some extent must its larger branches. It is true that as the pulse wave travels towards the periphery it is gradually smoothed out and dissipated by the elastic yielding of the arterial walls; hence in the smaller vessels the stream becomes practically an even flow, but that is one of the points on which the mechanical hypothesis is based. It is not in the smaller vessels that atherosclerosis tends to develop but in the aorta and the coronary and other medium-sized arteries which receive most of the impact of ventricular systole. The lesions develop mainly at bifurcations, branchings, and flexures where the stream strikes directly against the vessel walls; they are most prominent in arteries which, being loosely supported, are less restricted in movement (e.g., the extramural coronaries and the cerebral arteries); they are prevalent in such conditions as hypertension where the pulse pressure is high; and in short they abound wherever and in whatever conditions pulse movements are accentuated.

If, as is generally acknowledged, the conversion of the blood-flow from an intermittent to a continuous one depends on the elastic yielding of the arterial walls, then there must be movements of the walls. How great these movements are, or how far they are carried towards the periphery, is uncertain, but in so far as they are known to occur they must be regarded as potential sources of strain.

Arterial Structure

To understand the possible effects of pulse movements it is necessary to consider certain peculiarities of arterial structure. The arteries are elastic tubes composed of at least three different tissues—muscle, elastic tissue, and fibrous tissue. Since these differ in their elastic properties, the efficiency of the structures as a whole depends to a great extent on the special arrangement and freedom of interaction of these elements. It should be understood that, although muscle predominates in many of the arteries, there is no question of a muscular contraction and relaxation at each pulse beat. Muscular contraction is concerned with the tone of the arteries, which determines their mean diameter relative to the blood-pressure, but muscle is also elastic and can therefore be stretched and will recoil again to its original length when the stretching force is removed. This is the property which enables the arteries to dilate and recoil with the pulse beats.

It is sometimes thought that the elasticity of arteries depends essentially on the so-called elastic tissues they contain; but, judging by the appearance of the elastic laminæ in histological sections, the elasticity of these is not of a very high order. In this connection there is a fundamentally important point which is commonly overlooked. MacWilliam and Mackie (1908) showed that arteries contract after death, and that the degree of contraction is indicated by the waviness of their elastic laminæ and the wrinkling of their intimal surfaces. This is important in two respects: (1) it means that most arteries examined are in a state of post-mortem contraction, a fact which should always be taken into account in interpreting pathological appearances; and (2) it shows that the elastic laminæ cannot shorten to the same extent as the muscle and so have to adjust themselves by folding or wrinkling. The same applies to the fibrous tissue of the intima, which is usually finely wrinkled in sections.

Since it is obvious that all these tissues have to stretch to the same point when the artery is dilated, it follows that the muscle, which is responsible for the contraction, has a greater range of recoil than either of the other elements—in other words, a greater degree of elasticity. This may seem trivial but it is important, not so much as a measure of the elasticity of the various elements as in the fact that it illustrates how the elements adjust themselves to movements beyond their contractile range. From it we see that for complete functional efficiency there must be looseness and flexibility of the tissues.

Mechanical Hypothesis

The suggestion put forward in 1926 was that impairment of the elasticity or flexibility of the intima of an artery must lead to just that kind of structural disorganisation which is seen in atherosclerosis. In that condition there are dense fibrous thickenings which obviously stiffen the intima, and their disruptive effects are brought into prominence by post-mortem contraction. In the atherosclerotic aorta, for example, the thickened intimal plaques, being too stiff to conform in the normal way to the contraction, become coarsely crumpled, with the result that in parts they bulge into the lumen and are torn away from the media (fig. 1). Post-mortem contraction, it was suggested, is merely an exaggerated recoil; and the pulse movements in life, although more limited, must have similar effects. Accordingly atheroma

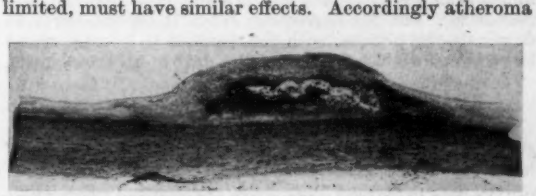

Fig. 1—Atherosclerotic plaque in aorta (frozen section): post-mortem contraction has caused the stiffened intima to buckle inwards and become loosened from the media. It is suggested that the same effect is produced by pulse movements in life, and that the spaces so formed, becoming filled with fatty debris, constitute atheromatous foci. (Hæmalum. × 10.)

was viewed as the tearing and destruction of tissues which resulted from thickening and loss of elasticity of the intima.

This conception was but a slight modification of a view which had long been current, Virchow having regarded atheroma as a loosening of the tissues of the intima. Later Aschoff, in Germany, and Sir Clifford Allbutt, in this country, described it as an effect of shearing between the layers, and though all these authorities recognised pulse movements as the damaging forces they ascribed the damage to overdistension of the arteries rather than to the elastic recoil, and imagined a sliding of one coat over another rather than a tearing apart of the layers.

The new hypothesis had little appeal since it was based on a post-mortem appearance which had no ascertainable relationship to conditions in life. Even on the assumption that the arteries moved with pulsation, it could not be claimed that any pulse movement would be comparable with the contraction occurring in an artery when it is emptied of blood; and there seemed to be no way of showing that the elastic recoil in life could ever be forceful enough or extensive enough to injure the tissues in the way suggested. The apparent bulging of the intima in atherosclerosis had always been taken for a swelling or proliferation of the tissues together with an accumulation of fat, and in view of this apparently straightforward explanation the crumpling idea seemed a little fanciful. Moreover it did not adequately explain the two most important processes in atherosclerosis—fatty change and fibrous thickening. Ever since Anitschkow showed that a cholesterol-rich diet produced lipoid deposits in the arteries of rabbits, it had been taken for granted that fatty change was the primary and essential one, and no theory which did not explain it was likely to be acceptable.

Nevertheless the new hypothesis was of value in that it provided a fresh way of looking at arterial diseases, and one by which many of the old-established notions would not bear scrutiny. There was, for example, one important feature of atherosclerosis which was commonly interpreted in a way that could not easily be reconciled with the mechanical point of view—namely, narrowing.

It had always been taken for granted that the narrowing of arteries was due to overgrowths of the intimal fibrous tissue encroaching on the lumina; but, when functional activity was taken into account, this seemed very unlikely. Arteries are elastic tubes, dilating and recoiling with each pulse beat; and, whereas the dilatation is a movement imposed on them by the pulse pressure, the recoil is a function of their own elasticity, and anything like a fibrous overgrowth which reduces this must interfere with their ability to recoil. They will thus be left in the more or less dilated position and, deprived of their elasticity, will be likely to stretch progressively under the influence of the blood-pressure.

To those accustomed to the orthodox view this may seem an awkward line of reasoning, but it is largely borne out by the vast majority of atherosclerotic lesions. In them the arteries are for the most part wider than normal, and it is only occasionally and in some parts that they are narrowed; but the narrowing, when it occurs, tends to dominate the picture, with the result that it has come to be regarded almost as an essential part of atherosclerosis.

Thrombogenic Hypothesis

It was, as we have stated, difficult to see how an overgrowth of the intima could narrow an artery, but the fact remained that the arteries were in some instances narrowed, and it seemed that some explanation other than an overgrowth was to be found. One could imagine various ways in which the lumen of an elastic tube could be reduced, the simplest being by partially occluding it by solid matter, which was exactly what happened when a mural thrombus formed in an artery; but in the early part of this century arterial thrombosis, apart from total occlusion, was not regarded as very common, and it did not therefore suggest itself as a likely solution to this problem. Nevertheless a search was made in cases of coronary and aortic atherosclerosis for evidence of mural thrombosis, and the results were surprising (Duguid 1946, 1948). Thrombi of all kinds were found with astonishing frequency, ranging from large masses of red clot, almost occluding the lumina of the arteries, down to thin mural deposits of fibrin, so small as to be hardly detectable. Some were freshly formed and others partly organised, and from a comparison of the various examples it soon became evident that thrombosis, instead of being an occasional complication of atherosclerosis, was an important factor in its pathogenesis.

When a mural thrombus forms in an artery it becomes covered with endothelium and is incorporated in the vessel wall, with the result that, on subsequently being organised, it forms a fibrous thickening of the intima. The endothelium is in fact an adjustable membrane (Duguid 1952) capable of rearranging itself so as always to interpose a cellular lining between solid matter and the blood-stream, and by this mechanism tissues which form part of a vessel wall may actually have originated as hæmatogenous deposits in the lumen. Mural thrombi, especially if they are of the red type, commonly undergo fatty change and thus assume the characters of atherosclerotic plaques; and there is good reason to believe that a considerable proportion of the lesions classified as atherosclerosis are altered thrombi.

The thrombogenic hypothesis has been confirmed by a number of observers, including Harrison (1948), Geiringer (1951), Heard (1952), Crawford and Levene (1952), Morgan (1956), and others, and thus, out of the application of the mechanical hypothesis, the long-forgotten teaching of Rokitansky was revived and a new principle in arterial pathology established in the light of which much of arterial pathology needs to be reconsidered.

It is therefore easy to see how narrowing of the arteries is brought about; and it may seem surprising, in view of the frequency of mural thrombosis, that narrowing is not more constant. But there is, as we shall show, a compensating mechanism whereby that danger is usually averted.

Effects of Mural Thrombosis

There can be no doubt that the incorporation of a mural thrombus into the intima of an artery reduces both the elasticity and the flexibility of that coat. Mural thrombi, when newly formed, may be relatively soft and plastic, but under the influence of the pulse pressure they are soon beaten into compact layers of hyaline substance, and when they are converted into fibrous masses they affect the vessels in various ways according to their relative size. In the first place, quite apart from their occluding effects, they may, if large and firm, practically immobilise the particular segments of the vessel walls to which they are attached, and, when they do so, the walls are fixed nearly always in the dilated position.

To understand this fundamental point it is necessary to remember that the thrombi, if they leave enough room for an effective blood-stream to pass, immediately come under the influence of the blood-pressure and have to conform to such movements as it imposes. They have to accommodate themselves to the shape of the vessel wall at the height of the pulse wave; and, being more plastic than resilient, they become moulded to that shape, so that when they are subsequently converted into fibrous tissue they may, if firm, virtually clamp the vessel wall in the dilated position. Thus mural thrombi, although they at first reduce the lumina of the arteries, tend to increase their mean diameter, thus cancelling out the initial narrowing, if it is not too great. When this effect is coupled with the progressive dilatation which follows loss of elasticity, the compensation may be more

than adequate. Consequently atherosclerotic arteries, even when greatly thickened, are often wider than normal—the "senile ectasis" of Aschoff (1937)—and it is only when relatively large thrombi form in small vessels that there is absolute and permanent narrowing.

Smaller thrombi, on the other hand, have a more localised effect; and this, we believe, is what constitutes the atherosclerotic process. A thrombus may be too small to interfere with the resilience of the vessel wall, but if it cannot move in unison with the rest of the structures it is bound to create local discord; and, if movements continue in spite of it, something has to give way. In the contracted artery post mortem we have seen what may happen, but it remains to be shown that the same happens in the living artery, and it is in this connection that intimal hæmorrhage is significant.

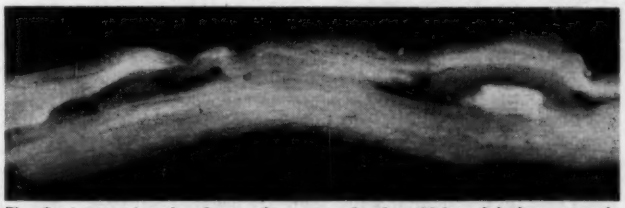

Fig. 2—Atherosclerotic plaques in aorta, showing thickened intima coarsely crumpled and in parts loosened from media. Dark patches at angles of separation represent hæmorrhages. (Direct photograph. × 10.)

Intimal Hæmorrhage

The transformation of mural thrombi into fibrous thickenings has been adequately described elsewhere, but there is one feature to which we must draw special attention because it concerns the evidence we present. Where large thrombi are concerned, a full-scale process of organisation is established, such as is seen in a fibrinous exudate. Capillaries enter from the lumen of the vessel and from the vasa vasorum (Geiringer 1951, McLetchie 1952) and invade the mass, vascularising the intima. Since many of these new vessels remain after the organisation is completed, they become a feature of advanced atherosclerosis. Such vessels may be a source of hæmorrhage, and it is in this we find the evidence of mechanical effects.

Intimal hæmorrhage has long been recognised as a feature of atherosclerosis, but special attention has been paid to it in recent years, chiefly as a result of the detailed studies by Winternitz et al. (1938), Paterson (1938), and Wartman (1938). It is perhaps unfortunate that some of the most conspicuous examples are seen in cases of fatal coronary thrombosis, and that more attention has been paid to these, and their possible relationship to coronary occlusion, than to the small and inconspicuous extravasations of blood which are far commoner and in our opinion no less significant.

These small extravasations are usually seen in the deeper layers of the intima and quite unconnected with the surface; so there is no reason to suppose that they play any part in fatal occlusion. They often consist of no more than a few erythrocytes lying free in the tissues, and where there is much fatty change they are easily overlooked. Winternitz et al. noted that they were often situated at the margins of the atheromatous foci; but they related this to the fact that vascularisation was plentiful in these areas, and, beyond remarking that mechanical factors might play a part in their production, they did not connect them with injury. Nevertheless these extravasations occur just at the points where the layers of the intima are apparently being torn apart, and their presence seems fairly clear proof that the tearing has occurred in life.

Our attention was first drawn to this in a common iliac artery excised surgically because it was occluded. The intima in this vessel was greatly thickened by several layers of fibrous tissue, one of which was fractured. The fracture might have passed as an artefact, caused by rough handling, had there not been signs of old hæmorrhage around it, showing that it had taken place some time before the vessel was excised.

This observation led us to look for other evidence of the same kind, and one of the first coronary arteries to be examined with this in mind provided it. In this vessel there was a patch of thickened intima canted upwards and thrust into the lumen, so that it was almost severed from the neighbouring part; and again there was antemortem hæmorrhage at the point of tearing.

Of 50 cases of severe coronary atherosclerosis, not all with fatal occlusion, we found hæmorrhages in 33. These hæmorrhages were typical examples of a condition with which we had long been familiar, but it was not till we came to study their exact situation that their significance became apparent. In 16 of them they were almost all at the margins of the atheromatous foci, just at the points where the layers of the intima were being torn apart; and even in the other 17, where the extravasations were more widespread, there were usually some points of leakage in these same situations.

This feature is most easily demonstrated in the aorta. For example, fig. 2 shows a patch of thickened intima coarsely crumpled and partially torn away from the media in several places; the dark patches at the angles of separation are hæmorrhages. This finding, which is by no means uncommon, seems to provide the strongest support for the mechanical hypothesis, for it indicates, as clearly as any histological sign could, that the same forces as tear the layers of the intima apart in post-mortem contraction are also in operation in life and are a source of injury to living tissues.

Hæmorrhage and Atheromatous Degeneration

One of the deficiencies of the mechanical hypothesis as put forward earlier in this paper was the fact that it did not explain the fatty changes in atherosclerosis. It was subsequently noted incidentally that mural thrombi themselves undergo fatty changes, but it was not suggested that all the fatty debris which accumulates in atherosclerosis is derived from thrombi. The debris is altogether too plentiful, and the accumulations occur in the deeper layers of the intima, beneath the thrombi, rather than in them; so obviously there must be some other sources of the fat. The view we now wish to bring forward was prompted mainly by a demonstration by Dr. A. D. Morgan to the Pathological Society of Great Britain and Ireland in January, 1956.

Morgan recalled that Winternitz et al. in 1938 had suggested that atheromatous material was derived from intimal hæmorrhage; but it was his own demonstration that convinced us of the truth of this and showed how the thrombogenic hypothesis could be linked with the mechanical one. In his monograph on *The Pathogenesis of Coronary Occlusion*, Morgan (1956) concludes that the cholesterol and other fatty debris in atherosclerosis are products of blood destruction and can be accounted for by small hæmorrhages recurring over long periods. Our own findings confirm this. The hæmorrhages almost always communicate with the atheromatous foci, and disintegrating corpuscles are usually so intimately mixed with lipoid droplets, cholesterol crystals, hæmosiderin, ceroid pigments, and other debris that it is hard to avoid the conclusion that the larger atheromatous accumulations are the products of recurring hæmorrhages.

It would hardly seem prudent at this stage to suggest that all the fatty changes in atherosclerosis could be

products of hæmorrhages or thrombi, since neither hæmorrhages nor thrombi are detectable in most of the early lesions. Yet Paterson et al. (1956) have reported that iron pigment is demonstrable even in the very early fatty lesions, and we have been able to confirm this. Since blood is the most likely source of such pigment, we are forced to conclude that intimal hæmorrhage must be commoner than is generally supposed. It is perhaps difficult to accept the idea of hæmorrhage where there is no vascularisation of the intima, but it should be recognised that, in the arterial walls, there are peculiar physical conditions making the introduction of blood into the intima possible without vascularisation, especially when there is no great thickening.

Many writers have discussed the question of tissue pressure in relation to permeation of the arterial walls by fluids and hæmorrhage (Drury 1954), but few have taken into account how pressure may be affected by pathological processes. In the normal artery the intimal tissues are constantly under a positive pressure which varies with pulsation, but the same conditions do not necessarily obtain in the atherosclerotic artery. When, during recoil, the thickened intima is crumpled and loosened from the media, there must be phases of reduced pressure at the points of loosening, with the result that fluids are drawn in to fill the spaces thus formed. The most readily available fluids are blood and plasma, and the fact that fats are found need not be surprising in view of the fact that these fluids may be rich in lipids. It seems hardly necessary, therefore, to postulate disturbances of the lipid metabolism, or specific affinities on the part of the arterial tissues for lipids, to explain the presence of these substances in the arterial walls.

Experimental Evidence of Mechanical Factors

In 1933 Harrison recorded some experiments which seem never to have received due attention. He produced cholesterol lesions in rabbits previously treated with large doses of calciferol to produce medial calcification of their aortas. Whole segments of their aortic walls were rigidly calcified; and, when the affected rabbits were later given the standard cholesterol treatment, only the parts of their aortas which still remained mobile developed cholesterol deposits, while the rigid parts remained free. The only exceptions were one or two instances where the rigid layers had fractured and presumably injured the overlying intima, which was heavily infiltrated with cholesterol at these points. In most of the cases, however, the greatest depositions were immediately around the margins of the calcified areas, where local discord was likely to have been most acute.

If there is anything to be learned from experiments on animals regarding the cause of atherosclerosis, surely it is that movement is the crucial factor. Cholesterol experiments have repeatedly been cited as evidence that fats are the prime factors in atherosclerosis, but Harrison's experiments show that cholesterol is merely a very effective "marker" of structural damage which is otherwise obscure. Aschoff (1924) stated that: "The lipoid concentration of the food does not cause atheroma, but essentially influences the characters of the atheromatous patches by determining the presence or absence of fatty change," and Harrison's experiments seem to bear this out.

We have also seen this borne out in the recent case of a coloured Jamaican who died of carcinoma of the liver. He was so emaciated that even the atheromatous fats in the aorta and coronary arteries were replaced by a gelatinous substance. The arteries were in no way improved by this, however, for there was still the same structural disorganisation. There was, in fact, still the same degree of atherosclerosis, but the character of the atheromatous patches was influenced by a shortage of fats.

The Genesis of Atherosclerosis

It has been shown how mural thrombosis leads to atherosclerosis, but little has been said about the cause of the thrombosis itself. The factor commonly cited is damage to the vessel walls, and the findings in atherosclerosis bear it out, since most of the recognisable thrombi in that condition are associated with lesions of the underlying intima. Atherosclerosis is itself a form of damage and tends to promote further thrombosis; so the typical plaque is often built up of successive fibrin deposits, one on top of another in a laminated formation; but how the process begins in the first place is a more difficult problem.

There are many conceivable ways in which the internal lining of an artery may be damaged, and to cite any one as the primary lesion in atherosclerosis can only be speculative. Atherosclerosis begins in childhood (Geiringer 1948), and in the arteries in children it is often difficult to distinguish normal changes from pathological ones. In man there is a progressive fibrous thickening of the intima of the larger arteries almost from birth, and so universal is this that it can be taken as a natural growth process. One might therefore hesitate to compare it with atherosclerotic thickening, yet Levene (1955) has found that, even in the aorta of young children, the subendothelial layers contain fibres which in their electronmicroscopic pattern resemble fibrin. If his findings are confirmed, we may have to conclude that in normal development, as well as in atherosclerosis, the intima is increased by the incorporation of solid matter from the blood-stream.

We are accustomed to thinking of normal growth processes as beneficial, and we assume that, so long as these natural thickenings of the intima are even and uniform, harmony would be maintained; but in point of fact they seldom are uniform. Even in young children the intima of the aorta around the openings of the intercostal arteries is usually thicker than elsewhere, and it is perhaps significant that these are the sites of the earliest fatty streaking in young people as well as of some of the severest lesions in adults. It seems likely that even the slightest local overloading of the intima with fibrous tissue may interfere with coördination of the structures, and, although in ordinary circumstances a slight stiffening may be tolerable, it must nevertheless reduce the ability of the tissues to adapt themselves to any increased vascular activity that may arise. Thus even in our natural growth processes there may be the potentialities of disease.

Dangers of Atherosclerosis

We are therefore forced back to the position of the older writers who regarded atheroma as part of the wear and tear of life, and this, in view of the increasing incidence of deaths from coronary disease, may seem alarming. It need not unduly disturb us, however, for coronary disease is not quite the same as atherosclerosis. "Coronary disease" is a clinical term implying narrowing or occlusion of the coronary arteries, and narrowing is not an essential part of atherosclerosis. There can be severe atherosclerosis of the coronary arteries, for instance, without any narrowing, just as there can be fatal narrowing without much atherosclerosis. Hence the death-rate from coronary disease in a community is no reliable gauge of the prevalence of atherosclerosis.

This may seem paradoxical in view of our contention that atherosclerosis and arterial narrowing are both products of thrombosis, but it must be appreciated that thrombosis is a double-edged process. It may on the one hand be part of a natural protective or reparative mechanism, or it may on the other be a dangerous pathological process; and the thrombi which are responsible for atherosclerosis may be quite different in their nature from those which cause occlusion. Atherosclerosis is universal in adults, and all adults have thrombosis in their

coronary arteries from time to time; but so long as the thrombi are small no great harm is done. There are factors in the blood or in the tissues which control thrombosis and keep it within safe limits, and it is when such factors fail that the process gets out of control and becomes a danger. That state of affairs is a complication of atherosclerosis rather than an essential part of it.

It is beyond our present scope to discuss the factors which govern thrombosis. Astrup (1956) has referred to the multiplicity of agents, activating and inhibiting, which maintain the equilibrium between the formation and removal of fibrin in the living body, and in summarising them has made a strong case for regarding fibrinolysins as the critical factors. Mole (1948) has made similar suggestions, and it seems clear that fibrinolysins are among the first problems to be tackled in the campaign against coronary disease.

Uncomplicated, or simple atherosclerosis (if we may use the term), is a very different problem. Although thrombosis plays a part in its development, it is a relatively benign part, and if we are to treat the condition as an evil whose cause must be eliminated we have far fields to explore in seeking the cause. In the past thirty years medical thought has tended to veer away from the idea of wear and tear and to ignore mechanical factors, perhaps because these factors have been rather vaguely represented; but it is doubtful if any worker in this field would entirely rule them out. For our part, we have repeatedly asked ourselves what must happen when a layer of relatively inelastic material is fixed to the inner surface of a pulsating elastic tube, and the answer has always been something which in its general configuration would reproduce very closely what is found in atherosclerosis.

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PROGNOSTIC FACTORS IN MYOCARDIAL INFARCTION

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From the Radcliffe Infirmary, Oxford

(*concluded from p. 1161*)

LONG-TERM PROGNOSIS

WE have already shown that, of 543 patients with myocardial infarction admitted to the Radcliffe Infirmary in 1940–54, 195 died within eight weeks—a period arbitrarily selected as covering the acute attack. Thus there were 348 survivors of the acute attack. We review here the prognostic factors influencing the course of these survivors.

TABLE XXX—NUMBER OF DEATHS IN REMAINDER OF THE FIRST YEAR IN DIFFERENT TREATMENT-PERIODS

Period	No. surviving acute attack	Deaths in remainder of first year	
		No.	%
I (1940–47)	66	10	15·2
II (1948–51)	105	14	13·3
III (1952–54)	177	25	14·1
Total ..	348	49	14·1

TABLE XXXI—DEATHS AMONG SURVIVORS OF THE ACUTE ATTACK IN REMAINDER OF THE FIRST YEAR

Sex	Good-risk			Bad-risk		
	No. of patients	Deaths		No. of patients	Deaths	
		No.	%		No.	%
Male ..	127	7	5·5	110	26	23·6
Female ..	50	3	6·0	61	13	21·3
Total ..	177	10	5·6	171	39	22·8

Findings

Prognosis during the Remainder of the First Year

The chance of dying during the remaining ten months of the first year was still considerable; 49 patients (1 in every 7) died in this period. The majority of these 49 deaths were in the earlier months after the acute attack—33 in the first four months. In other words, about 10% of the survivors of the acute attack died during the succeeding four months. During the period covered by our study (1940–54), there has been no improvement in this respect (table XXX).

Some individual factors are of considerable importance in determining prognosis during this first year. We have

TABLE XXXII—DEATHS AMONG TWO MAIN AGE-GROUPS IN REMAINDER OF FIRST YEAR

Age (yr.)	Good-risk			Bad-risk		
	No. of patients	Deaths		No. of patients	Deaths	
		No.	%		No.	%
Under 60 ..	100	5	5·0	63	12	19·0
Over 60 ..	77	5	6·5	108	27	25·0

confined ourselves to clinical factors which can be recognised early in the course of the acute attack. From our own data the important factors associated with a bad prognosis in patients who survive the acute attack are:

(*a*) Evidence of cardiac distress in the early days of the acute attack: (1) cardiac failure, either left ventricular or congestive, and not necessarily severe; (2) cardiac arrhythmia (auricular fibrillation or flutter, or multiple extrasystoles); or (3) gross cardiomegaly.

(*b*) A history of a previous attack of myocardial infarction, though this is less important than the factors covered in (*a*).

Factors which seemed to have little bearing on prognosis in this stage included known hypertension, diabetes mellitus, and previous angina of effort. We can therefore divide the survivors of the acute attack into good-risk and bad-risk cases, the bad-risk ones being those with cardiac distress early in the acute attack or whose recent infarction was not their first. During the remainder of the first year the bad-risk patients are four times as likely to die as the good-risk patients (table XXXI). As in the acute attack, sex did not influence the prognosis.

Age has negligible importance in prognosis compared with whether the patient is a good or bad risk as already defined. As individual age-groups are small, we have fused them into two main age-groups (table XXXII, fig. 11).

Among the good-risk patients the development of another myocardial infarct was the major cause of death. Among the bad-risk patients, death from recurrence was commoner than among the good-risk patients; but death from cardiac failure unassociated with a fresh infarct was the outstanding cause of the difference between the two groups (table XXXIII).

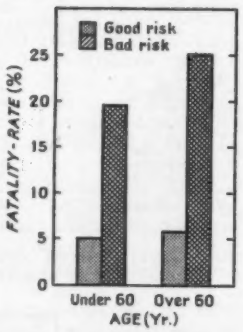

Fig. 11—Fatality-rates two to twelve months after myocardial infarction in good-risk and bad-risk patients aged under 60 and over 60.

Prognosis over Several Years

The fatality-rate in the second year after an infarct was lower than in the first year but still considerable; 1 in every 10 patients died in this period. Thereafter, the fatality-rate ran at a lower level. Allowing for random fluctuations, about 5% of the survivors of the original acute attack died each year after the second year (table XXXIV, fig. 12). It will be recalled that, though all but 1 of the patients were followed up to January, 1956, the length of follow-up varied, and therefore the number of patients shown as followed up dwindles progressively over the years. We have included a cumulative fatality-rate because this gives a good overall picture of the subsequent fate of the survivors of the acute attack. Of every 5 survivors of the acute attack 2 died within five years, and by ten years the proportion had risen to 2 out of every 3. The population at risk contained many old people, however, and a considerable number of deaths would be expected in any event. The Registrar-General (1956) has given the survivorship ratio for each age-group of men and women over the course of five years, 1946–50—a period which falls conveniently in the middle of the time covered by the present study. We have taken these figures to estimate expected fatality-rates for the survivors of the acute attack. Over five years the fatality-rate among the survivors of the acute attack of myocardial infarction was 39·3%; the corresponding figure for a sample of the same age and sex composition, but taken from the general population, was 16·1%—i.e., the chance of dying within the next five years was $2^1/_2$ times as great for survivors of myocardial infarction as for persons of the same age and sex in the general population.

TABLE XXXIII—CAUSES OF DEATH IN REMAINDER OF FIRST YEAR

Cause of death	Good risk (177 patients)	Bad risk (171 patients)
Recurrent infarction	7 (4·0%)	13 (7·6%)
Cardiac failure unassociated with recurrent infarction	3 (1·7%)	19 (11·1%)
Other known causes	0	3 (1·7%)
Uncertain	0	4 (2·3%)*

* In some of these patients there was presumptive evidence of cardiac failure.

TABLE XXXIV—PROGNOSIS OF SURVIVORS OF ACUTE ATTACK

Period of follow-up	No. of patients followed	Deaths in corresponding period		Cumulative fatality-rate (%)
		No.	%	
Remainder of 1st year	348	49	14·1	14·1
2nd year	292	29	9·9	24·0
3rd year	236	15	6·4	30·4
4th year	179	8	4·5	34·9
5th year	137	6	4·4	39·3
6th year	105	8	7·6	46·9
7th year	87	11	12·6	59·5
8th year	66	2	3·0	62·5
9th year	56	3	5·4	67·9
10th year	48	0	0·0	67·9

Long-term Prognosis of Good-risk and Bad-risk Patients

We have already defined the factors influencing death in the first year, and it is interesting to see for how long these factors operate. The bad-risk patients were four times as liable to die in the first year as the good-risk patients and twice as liable to die during the second year; but thereafter the two groups had a similar risk of dying (table XXXV). After five years, three-quarters of the good-risk patients and half the bad-risk patients were alive. Another way of looking at the same information is to compare the expectation of living five years for the good-risk and bad-risk patients with that of samples of the general population of the same age and sex. A good-risk patient had less than twice an "average man's" chance of dying, while a bad-risk patient had more than three times this chance (table XXXVI, fig. 13).

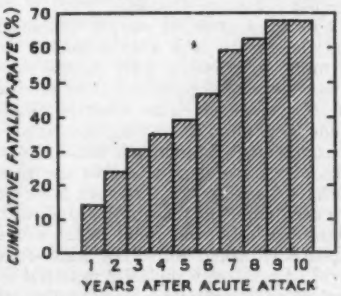

Fig. 12—Cumulative fatality-rate among survivors of acute attack.

Prognosis in the five years after the acute attack depended on the age of the patient as well as on whether he was a good or bad risk. Good-risk patients did better than bad-risk patients in both age-groups (table XXXVII), but the good-risk patients over the age of 60 years fared better than the corresponding patients under the age of 60 (fig. 14). The chance of death in the patients over 60 in the good-risk group was about the same as that of the general population. In the under-60s, the survivors of a myocardial infarction had more than three times the normal expectation of dying within the next five years. Fatality-rates in the bad-risk patients were greatly above the "expected" levels in both younger and older patients, but the outlook in the younger age-groups (though better in absolute figures than that in the older age-groups) was worse when considered in relation to normal expectation.

TABLE XXXV—SURVIVORS OF ACUTE ATTACK: SEPARATELY FOR GOOD-RISK AND BAD-RISK CASES

Length of follow-up (yr.)	Good risk				Bad risk			
	No. of patients	Deaths		Cumulative death-rate (%)	No. of patients	Deaths		Cumulative death-rate (%)
		No.	%			No.	%	
1	173	10	5·8	5·8	175	39	22·3	22·3
2	146	9	6·2	12·0	146	20	13·7	36·0
3	117	7	6·0	18·0	119	8	6·7	42·7
4	83	4	4·8	22·8	96	4	4·2	46·9
5	61	3	4·9	27·7	76	3	3·9	50·8

In view of these findings, it is of great interest to know the causes of death in the various groups. In most of the patients who died, we know fairly precisely the course of events, though there is a minority for whom the information is inadequate. Our main concern was

TABLE XXXVI—PERCENTAGE FATALITY-RATE OVER FIVE YEARS IN GOOD-RISK AND BAD-RISK GROUPS COMPARED WITH EXPECTED RATE IN GENERAL POPULATION OF SAME AGE AND SEX

—	Good-risk group	Bad-risk group
Survivors of myocardial infarction ..	27·7	50·8
General population	15·3	15·2

to see whether death followed a recurrent infarction or whether it was due to cardiac failure without clinical evidence of fresh infarction.

The relatively bad prognosis in the good-risk patients under 60 years was almost entirely due to recurrent infarction (table XXXVIII). Among the bad-risk patients, the chance of dying from recurrent infarction was about the same as for the good-risk patients under 60, but in addition there were many deaths from cardiac failure not due to a fresh infarction, and it was the combination of these two risks which made their outlook poor. The small number of deaths following recurrent infarction in the older good-risk patients seems the chief reason for their favourable prognosis.

Long-term Prognosis from Time of Admission to Hospital

We can now see the total prognosis of patients admitted to this hospital in the past fifteen years (table XXXIX, fig. 15). In simple terms, 1 patient in every 7 admitted died in the first forty-eight hours, and a third were dead by the end of the eighth week (which we have taken as concluding the acute attack). By the end of two years from admission, half the original patients were dead.

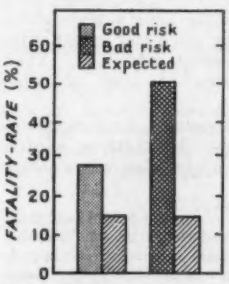

Fig. 13—Fatality-rate over five years in good-risk and bad-risk cases compared with expected rate in general population of like sex and age composition.

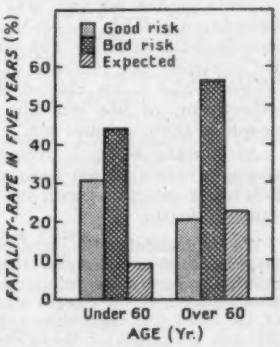

Fig. 14—Proportion of survivors of acute attack who die in next five years, compared with expected figures.

Thereafter, the risk of dying diminished; but another 10% died in the next three years, and by the end of five years 3 out of every 5 patients admitted were dead. The fatality was therefore formidable. But the risk of death was not evenly distributed, and the correct recognition of good and bad prognostic features makes it possible to select patients who, provided they survive the acute attack, have an expectation of life similar to that of persons of a corresponding age in the general population.

Discussion

Various studies have been made in the past twenty years of the long-term prognosis of myocardial infarction.

TABLE XXXVIII—MODE OF DEATH IN THE FIVE YEARS AFTER MYOCARDIAL INFARCTION IN VARIOUS GROUPS

—	Good-risk		Bad-risk	
	Under 60	Over 60	Under 60	Over 60
Mode of death:				
Recurrent infarction ..	15	5	11	17
Cardiac failure	2	4	7	23
Other known causes ..	1	0	3	3
Uncertain	4	2	2	8
No. of patient/years of follow-up	346	254	222	370
Rate of recurrent infarction, taking good-risk <60 as 100	100	45	114	106

Before that time, though it was realised that some patients could survive for many years, these were regarded as exceptional.

In 1934, a meeting of the Royal Society of Medicine concluded that there was insufficient evidence for any assessment of the long-term prognosis (Hay 1934).

Palmer (1937) analysed the records of patients known to have survived a coronary thrombosis and found almost 75% alive at the end of five years; unfortunately 45% of the patients could not be traced, so this estimate was subject to gross error.

Bland and White (1941) found that 31% of those who survived the acute attack were alive ten years later, but their study is open to the grave criticism that they included patients in whom coronary occlusion had been diagnosed retrospectively; naturally, such patients would bias the results in a favourable direction.

Katz et al. (1949) made a better study with a 97% follow-up lasting one to five years. Their results bear some resemblance to our own, except that their patients showed a generally worse prognosis. In their study, there was a very heavy incidence of recurrent infarction.

The present study has the advantage of being virtually 100% complete. There is the limitation that the period of follow-up varies from one to sixteen years, but we have been encouraged to treat the group as homogeneous because the proportion of patients dying in the first year

TABLE XXXVII—PROGNOSIS IN GOOD-RISK AND BAD-RISK PATIENTS

—	Good risk								Bad risk								Totals	
	Under 60				Over 60				Under 60				Over 60					
	Followed	Deaths			Followed	Deaths			Followed	Deaths			Followed	Deaths			Followed	Deaths
		No.	Rate (%)	Cumulative rate (%)		No.	Rate (%)	Cumulative rate (%)		No.	Rate (%)	Cumulative rate (%)		No.	Rate (%)	Cumulative rate (%)		
Period of follow-up:																		
1st year ..	100	5	5·0	5·0	77	5	6·5	6·5	63	12	19·0	19·0	108	27	25·0	25·0	348	49
2nd ,, ..	87	8	9·2	14·2	63	1	1·6	8·1	54	5	9·3	28·3	88	15	17·0	42·0	292	29
3rd ,, ..	69	4	5·8	20·0	52	3	5·8	13·9	43	3	7·0	35·3	72	5	6·9	48·9	236	15
4th ,, ..	50	3	6·0	26·0	37	1	2·7	16·6	35	2	5·7	41·0	57	2	3·5	52·4	179	8
5th ,, ..	40	2	5·0	31·0	25	1	4·0	20·6	27	1	3·7	44·7	45	2	4·4	56·8	137	6
Expected 5-year fatality-rate (%)				9·7				22·4				8·3				22·1		

TABLE XXXIX—PROGNOSIS FROM TIME OF ADMISSION TO HOSPITAL UP TO TEN YEARS LATER

Period of follow up	No. of patients followed	Deaths in corresponding period		Cumulative fatality-rate (%)	Survivors (%)
		No.	%		
0–2 days	543	75	13·8	13·8	86·2
2 days	543	120	22·1	35·9	64·1
Remainder of 1st year	543	49	9·0	44·9	55·1
2nd year	464	29	6·3	51·2	48·8
3rd ,,	376	15	4·0	55·2	44·8
4th ,,	290	8	2·8	58·0	42·0
5th ,,	229	6	2·6	60·6	39·4
6th ,,	177	8	4·5	65·1	34·9
7th ,,	144	11	7·6	72·7	27·3
8th ,,	111	2	1·8	74·5	25·5
9th ,,	94	3	3·2	77·7	22·3
10th ,,	79	0	0·0	77·7	22·3

of follow-up has been remarkably constant throughout the total period covered by the study. This being so, simple actuarial procedures allow us to make use of the whole series to estimate survival-rates. Long-term anticoagulant therapy was used in so few patients that it can be ignored, and the present results therefore represent the survival of patients in an era before long-term anticoagulant therapy was in vogue.

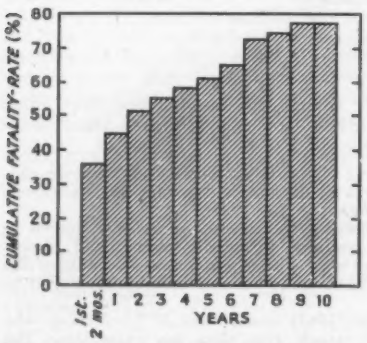

Fig. 15—Prognosis from time of admission to hospital to ten years later.

With respect to the individual factors which make for a good or a bad long-term prognosis, our results are definite. The importance of recurrent infarction emerges from this as from other studies. The only subgroup which is relatively free from this hazard is that composed of good-risk patients over the age of 60 years. These patients have the same chance of living five years after the acute attack as individuals of the same age and sex in the general population. From the point of view of future preventive treatment, the high rate of recurrence among good-risk patients under 60 is especially important. It is this risk alone that causes them to have a much greater chance of dying than other people of the same age in the general population (table XXXVIII, fig. 14). This finding emphasises the possible importance of long-term anticoagulant therapy in reducing this risk. We expressed scepticism of the value of anticoagulant therapy in the acute attack except in so far as it reduces the risk of fatal pulmonary embolism to a negligible level. But to say that anticoagulants have little effect on the course of an established myocardial infarct per se is not to imply that they are valueless in preventing one. Various studies suggest that long-term anticoagulant therapy improves long-term prognosis (Keyes et al. 1953, Owren 1954, Tulloch and Wright 1954, Suzman et al. 1955). But none of these have fulfilled the criteria of a fully controlled trial, and, in view of the great practical importance of the subject, it is to be hoped that such a study will be made.

Summary

Among 543 patients admitted to hospital for acute myocardial infarction in 1940–54, there were 348 survivors of the acute attack, which is defined as lasting two months from admission. These were all followed up until early 1956, except for 1 man who was lost after three years of follow-up.

Of the survivors of the acute attack, 1 in about 7 died in the remaining ten months of the first year, and this rate was constant throughout the whole period covered by the study. In the second year a further 10% died. Thereafter, about 5% died each year.

Bad prognostic factors, which can be recognised early in the acute attack, were evidence of cardiac failure (either left ventricular or congestive and not necessarily severe); cardiac arrhythmia including multiple extrasystoles; gross cardiac enlargement; and (though less important than the foregoing) a previous attack of myocardial infarction.

Patients who displayed one or more of these features constituted a bad-risk group. They had four times the chance of dying in the remainder of the first year as did the patients with none of them. Over the course of five years, their chance of dying was double that of the good-risk group.

Age was of negligible consequence in the long-term prognosis compared with whether the patient fell into the good-risk or the bad-risk group.

Among the good-risk group, the main cause of death within five years of the acute attack was recurrent infarction. The incidence of this was high among the patients under 60 and was the sole cause for their expectation of life being much worse than that of a sample of the same age and sex of the general population. By contrast, the patients of the good-risk group over 60 years had a low rate of recurrent infarction. Their expectation of life was the same as that of other people of their age and sex.

Among the bad-risk group, recurrent infarction was common in both main age-groups. In addition, cardiac failure not associated with another infarction was a potent cause of death.

We are grateful to the physicians of the Radcliffe Infirmary for permission to make this study and to Dr. A. H. T. Robb-Smith for permission to use the post-mortem records; to Miss P. Coombs, the records officer, and to Miss Betty Merry of her staff for assembling the case-notes; to Miss M. C. McLarty for preparing the figures; and to Mrs. E. M. Hewer and Mrs. B. Humphreys, who in succession were responsible for the heavy clerical work.

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SOME POSTPRANDIAL EFFECTS OF EATING VARIOUS PHOSPHOLIPIDS AND TRIGLYCERIDES

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DIETS containing a high proportion of fat are thought to be related to atherosclerosis and coronary thrombosis, possibly through the hypercoagulability of the blood which sometimes follows a fatty meal.

O'Brien (1956a) has shown that single meals of 50 g. of butter, margarine, and cooking-fat all produce a similar increase in the clotting-time accelerated with Russell's viper venom (' Stypven ' time). The ingestion of two eggs, which contain only 10 g. of triglyceride but 3 g. of phospholipid, produced a similar or even greater effect. The stypven time of platelet-poor plasma is very sensitive to the artificial introduction into the plasma of minute quantities of phosphatidyl-ethanolamine (P.E.), a substance that can be used instead of platelets in many clotting-tests (O'Brien 1956b). It appears, therefore, that the activity of the meal of eggs might be due, at least partly, to its content of P.E., some of which might enter the blood-stream relatively unchanged.

I report here a study and comparison of the effects of ingestion of eggs and of two kinds of phospholipid.

Bronte-Stewart et al. (1956) and other workers have shown that a diet of moderately saturated fats raises the fasting levels of serum-cholesterol and serum-β-lipoprotein, and that these raised levels are restored to normal if some unsaturated fats are substituted in the diet. I have tried to find out whether the difference in saturation of ingested fats influenced the changes in postprandial clotting-times. Chemical analyses were made to identify the substance responsible for the observed changes in clotting-time.

Previous Work

Maclagan and Billimoria (1956) report that the ingestion of butter, but not that of margarine, shortened the postprandial stypven time. This latter observation contradicts O'Brien's (1956a) findings; but the composition of the margarine, which can vary widely, is not stated.

Keys et al. (1957) studied the effect of fatty meals on the whole-blood clotting-time in siliconed tubes. The fats used were sardine oil (iodine value 185), corn oil (I.V. 120), butterfat (I.V. 38), and hydrogenated coconut oil (' Hydrol ') (I.V. 2·5). These workers found that the silicone clotting-time of whole blood was significantly shorter after all fatty meals, irrespective of the degree of saturation, but not after the control carbohydrate meal. Merskey (1956) and Merskey and Nossel (1957) found no change in the ordinary clotting-tests four hours after large meals of unsaturated vegetable oil and of more saturated animal fats, including bacon, eggs, and butter. The only test that showed a significant shortening was the stypven time; and this shortening was observed irrespective of the type of fat eaten.

Methods

The subjects of the present experiments were eight apparently healthy men and women, aged 20–40, all of whom initially showed a well-marked and approximately similar degree of change in the coagulability of their blood after a fatty meal. One of them took part in all the experiments. For each comparison the same subjects were studied, but not all the subjects ate all the different meals.

The volunteers fasted from 8 P.M. on the preceding evening. At 9 A.M. 20 ml. of blood, called the fasting sample, was collected by venepuncture. A breakfast of toast, marmalade, tea, and a little milk was then taken with 50 g. of the prescribed fat. At $2^1/_2$ and $3^3/_4$ hours after the meal further 20-ml. samples of blood were taken.

The 20-ml. samples of blood from each venepuncture were mixed with 2·0 ml. of 3·8% sodium citrate in siliconed tubes and immediately centrifuged at 3500 r.p.m. for 20 minutes, and the plasma was separated. 1·0 ml. of this platelet-poor plasma was then diluted with 4 ml. of saline solution. To 0·1 ml. of dilute plasma in a water-bath at 37°C was added 0·1 ml. of Russell's viper venom (stypven) 1 : 100,000, and a minute later 0·1 ml. of M/40 $CaCl_2$. The time taken for clotting was recorded as the stypven time. The results shown in the accompanying tables are the averages of at least two determinations.

The rest of the postprandial plasma sample that had the shorter stypven time, subsequently called the lipæmic sample, and the fasting plasma were then taken for biochemical analyses. The total ether-extractable fatty acid was estimated by a modification of the method of Van de Kamer et al. (1949), which in our hands had an error of about ± 15%. For the estimation of free and total cholesterol the method of MacIntyre and Ralston (1954) was used; this had an error of ± 5%. The lipid phosphorus was estimated in duplicate by the method described by Varley (1954); this also had an error of ± 5%.

The fats given were chosen to give as wide variation as possible.

The cod-liver oil (I.V. 165) was " non-cold filtered and deodorised " and contained 25% of the highly unsaturated arachidonic acid and 9% clupanodonic acid. The hardened cod-liver oil (I.V. 68, melting-point 36/38°C), a solid at room-temperature, was the same oil but hardened and possessed rather less than half the number of double bonds. The vegetable oil—soybean oil (I.V. 130)—contained different triglycerides, including 52% of linoleic acid, which is not present in cod-liver oil. The coconut oil (I.V. 8·5) was solid and, as well as being almost fully saturated, contained a large proportion of short-chain fatty acids, including 48% lauric acid and 17% myristic acid. These natural fats are mixtures of triglycerides but contain virtually no phospholipid. However, " pure " trilaurin and triolein containing no phospholipid were obtained in small quantities and were given as " meals."

The phospholipid that was freely available was a commercial extract from soybeans called ' Asolectin.' This contains less than 5% of triglyceride and about 30% of lecithin, 30% of P.E., and 35% of ' lipositol,' which is a mixture of inositol-containing phospholipids.

The egg lecithin was prepared specially for this experiment and contained less than 1% of P.E. Added artificially and in optimal concentration to platelet-poor plasma, it had no effect on the stypven time. 20 g. was isolated from five dozen eggs.

Results

The levels of free and of combined cholesterol in all the fasting and lipæmic plasmas from all the meals were estimated, and no significant changes were recorded.

Table I gives the results arranged in order of the iodine value of the fat eaten, and includes for comparison the average figures from previous experiments with meals containing 50 g. of butter, margarine, and cooking-fat

TABLE I—AVERAGE % CHANGE FOLLOWING FATTY MEALS OF DIFFERENT IODINE VALUE

Fat eaten	Iodine value	Weight eaten (g.)	No. of meals	No. of volunteers	Stypven time	Total fat	Lipid phosphorus
Nil	..	..	2	2	−6	2	−1
Cod-liver oil	165	50	2	2	48	56	22
Soybean oil ..	130	50	6	3	39	22	8
Hardened cod-liver oil	68	50	5	3	40	27	2
Average of above fats	..	50	13	3	40	29	8
Average of butter, &c.*	30	50	32	8	27	..	..
Coconut oil	8·5	50	5	3	−14	6	1
Coconut oil	8·5	100	2	2	−15	20	5

* These figures are abstracted from a previous study (O'Brien 1956a).

TABLE II—AVERAGE % CHANGE FOLLOWING FATS OF DIFFERENT CHAIN LENGTH

Fat	Chain length	Weight eaten (g.)	No. of meals	No. of volunteers	Stypven time	Total fat	Lipid phosphorus
Trilaurin ..	12	40	1	1	0	..	..
Coconut oil (48% lauric acid) ..	12–20*	50	5	3	−14	6	1
Soybean oil ..	18*	50	6	3	29	22	8
Cod-liver oil ..	16–20*	50	2	2	48	56	22
Triolein	18	50	1	1	23	7	3

* Chain length of major components.

(O'Brien 1956a). The "average % change" for each type of estimation is obtained by taking an average of all the fasting figures and subtracting from this value the average postprandial figure. This difference is expressed as a percentage of the fasting figure. The chemical estimations usually showed a postprandial increase; a decrease is indicated by a negative sign. The postprandial stypven times usually were the shorter. When they were longer, the average per cent. change is preceded by a negative sign.

Table I shows that cod-liver oil produced a considerably greater postprandial increase in the total fat and in the lipid phosphorus; but only two volunteers drank this oil, and, with the considerable variation in individual responses, these changes are not significantly greater than those following the ingestion of other fats. However, it will be seen that, apart from coconut oil, all the other oils of widely differing degrees of saturation gave similar results—i.e., the stypven clotting-time was shortened and the total fatty acid was increased, and there was a small variable increase in lipid phosphorus.

Coconut oil gave quite different results. The stypven clotting-time was not shortened but (on average) lengthened. The increase in total fatty acid after the five meals of 50 g. was significantly less than after the ingestion of the other fats. Only after 100 g. had been given did the fatty acids increase to a figure commensurate with those obtained after giving 50 g. of the other fats. It will be seen that, even with this larger meal the changes in clotting-time remained completely different from those after the other fats.

TABLE III—AVERAGE % CHANGE FOLLOWING MEALS OF EGGS AND FATS

Fat eaten	Weight eaten (g.)	No. of meals	No. of volunteers	Stypven time	Total fat	Lipid phosphorus
Nil	..	2	2	−1	−3	−3
5 eggs ..	25	2	2	40	38	..
All fats* ..	50	13	3	40	29	8
3 eggs ..	15	4	4	29	17	17
Soybean oil	15†	4	4	12	9	0

* From table I: all fats excluding coconut oil.
† One volunteer ate 50 g. of soybean oil.

In table II the various meals are arranged in order of the chain length of the fatty acids in the triglycerides eaten. It will be seen that the "meal" of trilaurin with twelve carbon atoms in the fatty acid was followed by no change in the stypven time, whereas triolein, with eighteen carbon atoms, shortened it considerably. The results obtained with the mixed natural oils transcribed from table I are included. It will be seen that coconut oil, with its preponderance of short-chain fatty acids, gave results similar to those obtained with pure trilaurin, whereas the other natural fats gave results similar to those obtained with triolein.

In table III are reported two experiments designed to investigate the suggestion (O'Brien 1956a) that eggs are more active than might be expected from their fat-content alone. In the first experiment each of two volunteers ate five eggs containing 25 g. of triglyceride. The effects on the stypven time and plasma-fat are compared with the effects in these same volunteers and one other volunteer of eating meals containing 50 g. of fat (see table I). It will be seen that the changes in clotting-time and the increase in total fatty acids are of the same order, although five eggs contained only half as much triglyceride; but the eggs contain about 7·5 g. of phospholipid, whereas the natural fats contain almost none.

In the second experiment each of four volunteers ate three eggs, containing 15 g. of fat, for one meal, and 15 g. of soybean oil for another meal. It will be seen that 15 g. of oil produced changes, in the clotting-times and in the amount of total fatty acids, which are hardly significant in view of the small numbers involved. The three eggs produced changes of almost double the magnitude and a considerable rise of the plasma-lipid phosphorus level.

TABLE IV—AVERAGE % CHANGE FOLLOWING INGESTION OF PHOSPHOLIPIDS

Lipid eaten	Weight eaten (g.)	No. of meals	No. of volunteers	Stypven time	Total fat	Lipid phosphorus
Asolectin ..	20	3	3	35	12	9
	10	1	1	23	8	0
Asolectin ..	10	2	2	23	4	3
Soybean oil ..	15					
Asolectin ..	5	2	2	17	..	..
Asolectin ..	2½	1	1	30	..	..
Lecithin ..	10	1	1	20	27	−3
	7½	1	1	−11	..	..
	2½	1	1	20	..	..

Table IV summarises the results of various "meals" of phospholipids. It will be seen that 20 g. of asolectin considerably shortened the postprandial stypven time, slightly increased the total fatty acids (much less than did 50 g. of triglyceride), and raised the level of the lipid phosphorus as much as did three eggs or 50 g. of triglyceride. A combination of asolectin and triglyceride did not obviously have a greater effect. Small quantities of asolectin (1·0–2·5 g.), that must have produced no chemical changes detectable in the blood by our methods, still produced definite changes in the clotting-time. The effect of various quantities of asolectin was not further investigated, because it was desired primarily to establish that the ingestion of phospholipid in the absence of triglyceride could change the clotting-time.

The 20 g. of pure lecithin available was given in different quantities to three different volunteers. It can be concluded that ingestion of this phospholipid can produce postprandial changes in the clotting-time even when given in small quantities.

It is obvious that the phospholipids are considerably more active weight for weight than the triglycerides

TABLE V—THE DEVELOPMENT OF "TOLERANCE" TO FATTY MEALS SHOWN BY ONE VOLUNTEER

Date	Fat eaten	Stypven time (sec.)			Total fatty acid in plasma (mg. per 100 ml.)		
		Fasting	Lipæmic	Difference*	Fasting	Lipæmic	Difference*
June 24, 1956	A	53	35	18	327	474	147
,, 26, ,,	B	48	34	14	305	476	171
,, 29, ,,	C	53	24	29	432	551	119
July 17, ,,	A	57	33	24	437	514	77
,, 18, ,,	C	51	46	5	416	459	43
Aug. 10, ,,	A	56	52	4	410	446	36

* The difference in seconds or milligrammes between the fasting and the lipæmic samples.
A, soybean oil.
B, cod-liver oil.
C, hardened cod-liver oil.

in shortening the stypven time after a meal; 10–20 g. produces about the same effect as does 50 g. of fat. A detectable change in the stypven time is produced by 2·5–5·0 of asolectin and by 15 g. of fat. It therefore seems that asolectin may be about five times as "active" on a weight basis as triglyceride. Clearly, in view of the small numbers of experiments and the variability of response, this is only a very rough approximation.

Table v shows the results in one of the volunteers. It will be seen from table i that the three fats eaten normally produced about the same changes. However, the magnitude of this volunteer's response, both in the clotting-time and in the total fatty acid level, to the meals decreased significantly. During the months of these experiments his health and diet did not alter. The only unusual feature was the eating of nine meals containing 50 g. or, in one case, 100 g. of fat. Only one other volunteer had as many fatty meals, and he showed little or no evidence of tolerance.

Discussion

The cause of the postprandial shortening of the stypven time remains uncertain. Poole (1955) and Robinson et al. (1955) suggested that a postprandial increase of unesterified acid might, at least partly, be responsible. They also suggest (Robinson and Poole 1956) that a postprandial rise in the level of plasma-P.E. may be responsible for the changes in clotting-time. Gordon and Cherkes (1955) have shown that there is an increase of unesterified fatty acid after a fatty meal, and a smaller but definite increase after a period of starvation. The ingestion of phospholipid, some of which may be absorbed comparatively unchanged (see below), has a considerably greater effect on the stypven time than has ingestion of a similar weight of triglyceride; and there is no evidence that the level of free fatty acid in the plasma is higher after eating phospholipids than after eating triglycerides. Thus it is possible that the stypven time under these conditions is largely measuring the level of available active phospholipid in the plasma.

With two exceptions the triglycerides, irrespective of wide variation in the degree of saturation of their fatty acids, all considerably shortened the postprandial stypven time. The exceptions were coconut oil and trilaurin, which slightly lengthened the stypven time. This suggests that the degree of saturation of the ingested fat is irrelevant to the postprandial changes observed in clotting-time. The short-chain length of the fatty acids in coconut oil and trilaurin may have been responsible for their different effect. If this is so, it suggests that, in man, the short-chain fatty acids are metabolised differently from the longer-chain fatty acids.

Bloom et al. (1951) have shown that, in rats, the long-chain fatty acids down to myristic acid (C14) are transported almost exclusively in the lymph after absorption. Considerably less lauric acid (C12) and only a minor part of the absorbed decanoic acid (C10) were recovered from the lymph; and the results of other experiments (Kiyasu et al. 1952) suggest that the short-chain fatty acids are transported mainly via the portal pathway. These findings are supported by the Lund group of workers (Blomstrand 1955a and b, Borgström 1955), who showed also that the degree of saturation of the fatty acids had no influence on the way they were transported.

It is confirmed that eggs shorten the stypven time more than can be explained by their content of neutral fat: this discrepancy is almost certainly due to their high content of phospholipids, since it has also been shown that ingested phospholipid, in the absence of triglycerides, is about five times as active in shortening the stypven time as is the same weight of triglyceride.

Bloom et al. (1954) and Blomstrand (1955b), who produced radioactive phospholipids by biosynthesis and fed them to rats with lymph fistulæ, reported that about 20% of the activity absorbed was recovered in the lymph as phospholipid and the remaining 80% as triglyceride. After the ingestion of triglycerides only about 2% of absorbed activity was recovered in the lymph as phospholipid, in contrast to the 20% recovered after the ingestion of phospholipid. This is about a tenfold increase. If the stypven time really measures free phospholipids, these changes observed in man (weight for weight, phospholipid was about five times as active as triglyceride) are of the same order as the chemical estimations in the lymph of rats.

Egg lecithin has been shown to shorten the postprandial stypven time when eaten, yet when added artificially to starving plasma it has no effect. This discrepancy may be due to the breakdown of the lecithin during absorption and to the synthesis of other phospholipids active in this clotting-system. Blomstrand (1955b) has shown that, during the absorption of lipids, some of the molecules are broken down, and that there is randomisation during resynthesis of the phospholipids and triglycerides that appear in the lymph.

Keys et al. (1957) report that 120 g. of hydrogenated coconut oil shortens the silicone clotting-time to the same extent as do other triglycerides. This observation is hard to reconcile with the present experiments, in which the ingestion of 50 g. or of 100 g. of untreated coconut oil lengthened the stypven time. It is, however, possible that under these conditions the silicone clotting-time measures a phenomenon which does not affect the stypven time. Indeed I have found that shortening of the stypven time is not always accompanied by shortening of the clotting-time.

It has been shown that, when one man ate nine meals of 50 g. or of 100 g. of fat during three months, the postprandial changes in clotting-time decreased considerably. Swank (1954) reported that his dogs also rapidly became able to absorb large quantities of fat without appreciable alteration of their plasma-lipids. In the present study three types of response to repeated fatty meals have been noted:

(1) *An absence of effect*: one person, rejected from the present series, showed no change in clotting-time for five hours after eating fatty meals.

(2) *The maintenance of a well-marked change*: the volunteer who ate most meals gave as good a response at the end as at the beginning.

(3) *The development of "tolerance"* (see table v).

These three types of response are not clear-cut, and many intermediate types were seen.

The biosynthesis of plasma-lipids, which are presumably involved in lipid transport, can be changed by altering the type of fat in the diet, as Bronte-Stewart et al. (1956) and many others have shown. It is not known whether this change or some other factor alters the response to a single fatty meal. Nor is it known if these different types of response are of any clinical significance, but clearly they might be.

The clinical importance of these results is difficult to assess. Intact platelets are inactive in the stypven test (O'Brien 1956a) and the phospholipid in them becomes available for this test only when the platelets are broken up or otherwise "activated." Presumably, therefore, the phospholipid in platelets becomes available for other in-vitro coagulation tests only after the platelets have been "activated" during the initial stages of coagulation. If lipæmic plasma contains free phospholipid, this would be immediately available for blood coagulation and would short-circuit some of the initial stages. Such blood might be more coagulable. But Merskey and Nossel (1957) found, after a fatty meal, no changes in in-vitro coagulation tests other than a shortening of the stypven time. The connection, considered more fully elsewhere (O'Brien 1957), between these highly artificial in-vitro

coagulation systems and the formation of a thrombus in the coronary artery is remote indeed.

Summary and Conclusions

The maximal changes in the Russell-viper-venom-accelerated clotting-time (the ' Stypven ' time) of platelet-poor plasma, the total ether-extractable fatty acid, the cholesterol (free and combined), and the lipid phosphorus were measured after meals containing various lipids. There was no correlation between the changes in clotting-time and in the amount of total fatty acids, and only poor evidence that considerable changes in clotting-time were associated with an increase in total phospholipids. The cholesterol levels did not alter postprandially.

Four fats of widely different degrees of saturation all shortened the postprandial stypven time by the same amount. It is concluded that probably the degree of saturation of ingested fats is immaterial to the post-prandial changes in clotting-time. Trilaurin and coconut oil either did not change or lengthened the stypven time. It is concluded that fats containing short-chain fatty acids may have a different effect from those with long-chain fatty acids. These conclusions are in agreement with other workers' results, obtained in rats and cats, which show that the degree of saturation of ingested fats does not affect the method of their transport after absorption, whereas chain length does.

A " meal " of phospholipids, compared weight for weight with a meal of triglycerides, shortened the stypven time much more, suggesting that some phospholipid is absorbed relatively unchanged. This result is independent of the activity or the inactivity of the phospholipid when added artificially to a test system of fasting plasma and Russell's viper venom. These results may be explained by the conclusions of other workers that, during the absorption of ingested phospholipid in rats, there is extensive hydrolysis, and that randomisation occurs during the resynthesis.

In one man the magnitude of the response to these fatty meals decreased during a period of three months. The development of this " tolerance " is discussed.

It is suggested that under these conditions the stypven time is primarily measuring the level of some phospholipids in the plasma.

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THE STATE OF DEVELOPMENT OF NEWBORN AFRICAN CHILDREN

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IN the course of work intended to define the psychological changes accompanying kwashiorkor it became necessary to obtain information about the psychomotor development of African children who were healthy and well nourished. The development was assessed by Gesell tests, as used in Paris (Roudinesco and Guiton 1950). It was found that, up to the age of about 3 years, the development was usually in advance of European standards, and that the degree of advance was greatest in the youngest children. The tests, which are normally considered to be applicable only to children more than 1 month old, were extended to younger children, and it was established that, at the age of 2 or 3 weeks, the development was equal to that of European children twice or three times that age. The results were not altogether unexpected, because clinical observation of African children in the first year of life had already shown that the accepted " milestones " of development—raising the head, sitting, standing, walking, and so on—were passed at an earlier age than in European children. Some of the results have already been published (Geber 1956). The present communication describes a recent extension of the work—the study of the African child at birth.

Material and Method

The technique used was that of André Thomas and his collaborators (Thomas and Saint-Anne Dargassies 1952, Saint-Anne Dargassies 1954, Koupernik 1954). Of 107 babies, 101 were seen in the maternity department of Mulago Hospital, Kampala, where they had been born; the others had been born at home and were seen there. They were all born in July or August, 1956. At birth none weighed less than 2·5 kg., and only 1 (who weighed 4·8 kg.) more than 4·1 kg. All the babies and their mothers were without any known disease, and delivery had not been assisted with instruments or by operation. About 60 children were of the Ganda tribe, which is indigenous to the region round Kampala and belongs to the Bantu-speaking groups, and the rest were of other tribes, some of them Bantu, but others Nilotic or Hamitic. No difference associated with tribe could be distinguished. There was no selection of cases. The nurses were asked to bring for examination any children that were available in the maternity wards. Twins and children delivered either by cæsarean section or by forceps were brought with the others and were examined but were excluded from the present series. For the examinations a bench or a table with a hard top was used, covered with a thick white cloth.

The children numbered 107. Their ages at the time of examination were as follows: less than 24 hours, 37; 25–48 hours, 45; 49–72 hours, 14; 73–96 hours, 6; 6 days, 1; 7 and 8 days, 2 of each. There were 52 boys and 55 girls.

Technique

Since the technique of detailed examination of newborn children is not practised widely in Britain, an account of some of the more important points may be helpful. It has been drawn largely from Koupernik (1954) and Thomas et al. (1955).

At birth the European child usually adopts an attitude that is a continuation of the intra-uterine position: the arms

and legs are held tightly in flexion and the fingers clenched over the thumb; lying on his back, he has his head to one side, and the positions of his arms and legs are asymmetrical, flexion and asymmetry being characteristic of the earliest age.

The tone of the arm muscles can be judged by the resistance to extension and by pulling the hand across the thorax and over the opposite shoulder. The position is like that reached when a scarf is thrown over the shoulder, and "the scarf movement" is an appropriate name. The legs are not only flexed but also externally rotated. Their hypertonicity causes the angle at which the knees can be bent to be limited to 90°, and the angle between the legs in abduction to be only 60° (a child whose legs are continuously in extension, or whose hands are permanently open, is deemed to be pathologically hypotonic). If the child is placed on his belly he turns his head to the side, with his cheek laid flat. The head cannot be turned from this position, nor, if the chin is put to the table, can the head be raised to free it. The rest of the body is bunched up, with the arms bent and the elbows in to the sides, and the thighs flexed so that the buttocks are raised. Sometimes, in this position, the child makes a kind of creeping movement (reptation). If the child is put into the sitting position, his trunk tends to collapse, with a kyphosis extending from the neck to the sacrum. The head falls forwards, and falls back if the trunk is made to lean backwards. The falling back, or rather the "head-lag" is seen best when the child is drawn up by his hands into a sitting position.

Many details of reflex activity have been described. The most spectacular, and one of the most consistent in European children, is the Moro reflex. It is best seen when the child is on his back and can be elicited in many ways, including knocking sharply on the table on which the child is lying, and by almost any sudden movement of the limbs or trunk —for instance, by raising the body by pulling on the arms until the head is just clear of the table and letting go. The arms are thrown out in full extension (one name for the reflex is "the arms of the cross"), the back is extended or arched, the head is drawn back, the fingers are fanned out, and the legs are extended. After the extension there is a characteristic return of the arms across the trunk.

The grasping reflex is well known and is also very constant. It should be equal in left and right hands and has two components, one the closing of the hand when the palm is pressed, and the other the maintenance of tension in the flexors, which makes it possible to raise the whole child by a stick grasped in the two hands.

Two other important reflexes can be shown when the child is held standing with his feet on the table: one, which can be called the "straightening reflex," is a tendency of the whole body to be straightened from its usual flexion; the other is the "automatic march" which is a walking step made with the knee flexed and the toes raised, the heel being the first part of the foot to touch the ground.

Tendon-reflexes are usually easy to find but vary with the tone of the part of the body.

Of the cutaneous reflexes the easiest to examine is the plantar reflex. It can be elicited over a large area of the outer side of the legs, as far up as the thighs, but is complicated by the grasping reflex of the toes, which is much like that of the fingers.

Among many other reflexes may be mentioned the ciliary and the photomotor (the tight closing of the eyes when the eyelashes are stroked or a light is shone into them), the "doll's eye" (the movement of the eyes in the opposite direction to passive movement of the head), the auricular (the turning of the head away when the lobe of the ear is rubbed), and the masseteric (the raising of the jaw when the chin is tapped).

Most of the hypertonicity disappears in the normal European child after 6–8 weeks, and the general attitude of flexion is lost. The ability to control the head so that it no longer flops forwards or back, and to straighten the back in the sitting position, is not acquired until 8–12 weeks. The Moro reflex, the automatic march, and the straightening reflex do not persist after 6–8 weeks.

Children at about 2 weeks follow with their eyes near moving objects and at 3 or 4 weeks start to move the head to help the pursuit.

Results

It was immediately obvious that the distribution of muscle tone in the African child differed from that in the European. When the African child was lying quietly at rest, his flexion was much less accentuated (fig. 1). Often the knees were only slightly flexed, and only one of the arms was flexed, with its hand half-open; the other arm might be fully extended, with its hand open completely.

Fig. 1—Aged 48 hours, lying with limbs extended: cheek is slightly raised, and liveliness of eyes is remarkable.

When the child was put down on his back, his head was usually on one side but could be turned from side to side and held in the median position. The eyes were wide open, and had a lively look. In many children, even in the first days, moving objects could be followed with the eyes, and rotation of the head accompanied the pursuit. There was plenty of spontaneous activity, and it was not unusual for the child to turn half on his side. The activity of the arms and legs was bilateral and symmetrical but greater in the legs than in the arms. The legs were chiefly flexed and extended but were also crossed and uncrossed. The feet were usually rotated so that the soles faced each other. The arm movements were not so brisk as those of the legs. The flexion of one arm and extension of the other have already been mentioned; when the child had his head to one side, the arm of that side would often be abducted and lying beside the face. The hands, which were usually open, were moved in all directions and were carried frequently to the face, particularly to the mouth. One child, a day old, who had received at birth a slight scalp wound in the occipital region, continually fingered the bandage over the wound. The thumb was less active than the other fingers but was often in extension. The fingers were spread from time to time.

When he was placed on his belly the child immediately turned his head to one side or (even more remarkable) raised his head, propping himself on his forearms (fig. 2). Sometimes the head was only raised momentarily in the median position and was then lowered, resting on the chin, but most of the children raised the head for several seconds, with the lumbar lordosis and the flexion of the legs increased, and with the arms pressed firmly on the table, the elbows against the body, and the forearms straight ahead. The hands were open, and sometimes the fingers clawed and scratched. The knees were as often flexed as partly extended, but the thighs were almost always flexed on the abdomen so that their fronts were rarely in contact with the table. The legs were less active than when the child was on his back, but fairly often they made creeping movements.

By far the most remarkable feature of the prone position was the control of the head and neck; it seemed almost as though all efforts were concentrated on that

Fig. 2—Same child as in fig. 1, raising chin clear of table.

Fig. 3—Aged 9 hours, able to prevent head from falling forwards.

control, which was evident again when the children, lying on their backs, were drawn up into a sitting position (figs. 3 and 4). Of the 107 children, 90 could prevent their heads from falling back. In these children the trunk remained straight.

When the child was sitting the head remained in the median position and was sometimes turned from side to side before finally falling forwards. When it had fallen, many children could immediately raise it again. The back was straight and upright, or inclined forwards, and a kyphosis was exceptional. The knees were moderately flexed, and the feet were rotated internally.

Some children, when being drawn into a sitting position, pressed on their heels as they were raised and straightened themselves until they were nearly standing. Held upright with the feet touching the table most of the children produced a straightening reflex, some pressing

Fig. 4—Aged 48 hours, held sitting: back is straight and head upright.

hard with both feet, and some with only one. A few children merely bent the legs. The "automatic march" reflex was found in only a few children, all aged 1–3 days.

The Moro reflex was by no means constant. In some children, mostly aged 1 or 2 days, the reflex was brisk and full, with extension and abduction of the arms and the usual slow return to the position held before, but in others, whatever means were used for trying to elicit the reflex, the amplitude of the response was poor. The reflex was found in no child aged more than 4 days. (Although the present communication is limited to the description of children who weighed 2·5 kg. or more, it is relevant that some smaller children, who might have been premature, produced a thoroughgoing reflex.) The grasping reflex was also inconstant, and if the child closed his hand on the object pressed into his palm he rarely continued to hold it firmly but soon relaxed his fingers and allowed the hand to resume its former attitude.

Further examination of tone showed that the extensibility of the flexors, in arms as well as legs, was much greater in African children than in European. The flexion was less hypertonic; it was easy to extend the forearms, and they did not return immediately into flexion but usually remained outstretched. On the contrary, the angle of flexion of the wrist was greater

Fig. 5—Aged 14 hours, showing extreme flexibility of the wrist.

than 90° (fig. 5). The scarf movement, the test of adduction of the arm, could be made easily. Abduction and the carrying of the forearm behind the shoulder also met with little resistance. Similarly, in the legs the popliteal angle was more than 90° and the angle between the straightened abducted legs more than 60°.

On the whole, then, the tone of the flexors in the African children was less in the limbs but more in the head and neck. Other reflex activity—ciliary, photomotor, masseteric, the sucking reflex, and the turning of the head on stimulation of the corners of the mouth—was present. On the other hand, the "doll's-eye" and auricular reflexes could not be elicited. Of the tendon-reflexes the patellar was very easy to elicit and the radials were almost as easy. Curiously, despite the relatively light tone of the arm flexors, the olecranon reflex could not be obtained. The cutaneous plantar reflex was nearly always extensor, and the grasping reflex of the toes was more constant than that of the fingers.

When the child was held horizontally face downwards on the open hand of the examiner, the back was straight, the head was kept from falling forwards, and the legs were usually extended in the line of the trunk (fig. 6). Held similarly, but face upwards, the child let the head fall back, and his back arched.

So far as could be determined in this series the results did not vary with the sex of the child, its birth-weight, or the parity of the mother. Unfortunately it was impossible to discover the length of the period of gestation, because the dates of the last menstruation were not accurately known.

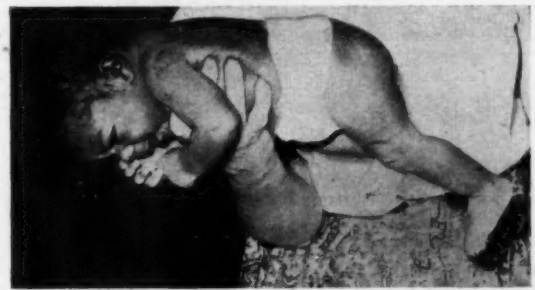

Fig. 6—Aged 43 hours: back is straight, head controlled, and left leg extended.

Discussion

There seemed to be no doubt that these African children had been born at a more advanced stage of development, judged by the method used, than the normal European child. The results of the examination were so consistent, and the degree of advance was so great, that there was little room for uncertainty. Much of the activity corresponded to an age of 4–6 weeks. Some was even more precocious: for example, the raising of the chin and the scratching of the fingers on the table, when the children were placed on their bellies, might be expected at 6–8 weeks, and so might the maintenance of the head in the mid-position when they were on their backs.

We do not intend, at this stage, to advance theories or facts in attempted explanation, but it is clear to us that the state at birth is consistent with some clinical observations: that the African child sucks vigorously at the breast almost from the first hour, and that he passes the milestones of development at a very early age. It is consistent also with the findings of psychomotor precocity in the earliest years to which we have already alluded. As we have said elsewhere (Geber 1956) an extensive investigation of all facets of the development of the African child is imperative. A more detailed study of the newborn child is planned, and will include twins, children born by cæsarean section, others whose birth has been associated with trauma, and others born before term. The last-named should be especially interesting; it is well recognised that African children whose weight at birth would by ordinary standards cause them to be classed as "premature," are often sturdy and active and can be reared without the special care that has to be lavished on European children of the same weight.

It is conceivable, even if it is in our opinion unlikely, that some of our findings could be explained by the existence of local conditions obtaining at Kampala, which is almost on the equator, and about 3500 ft. above sea-level. We are prepared to consider a number of possibilities, but we have one piece of evidence that may be helpful in making a judgment. At the same time as the African children a group of 15 European children—all that were available in the European Hospital, Kampala—and another group of 60 Indian children in the Asian Hospital were studied by the same method. The European children gave exactly the results that have been found in Europe, and the Indian children gave almost similar results. Neither group showed any great degree of overlap with the African children. The work on the European and Indian children will be reported when it has been extended to greater numbers; at the moment it may perhaps be admitted as a confirmation, in part, of the validity of the findings in the Africans.

Summary

The technique of neurological examination evolved by André Thomas in European children is described.

107 newborn African children who were considered to be normal at birth were examined by this method.

They proved to be at a more advanced state of development than newborn European children.

The advance was shown chiefly by a lesser degree of flexion, by a remarkable control of the head, and by the frequent absence of primitive reflex activity.

The results were consistent with clinical observations and Gesell tests made on young African children.

We are very grateful to Prof. Coralie Rendle-Short, the head of the obstetrical and gynæcological departments at Mulago African Hospital and the European and Asian Hospitals, Kampala, for allowing us to visit the maternity wards and to examine the children there, and to the nurses, who accepted most willingly our disruption of their routine. We have also to thank Dr. Saint-Anne Dargassies for her assistance in the use of technique of examination, and Dr. André Thomas for his criticism of our findings. The expenses of the investigation were paid from grants made by the International Children's Centre, Paris, and the mental health section of the World Health Organisation, and we thank especially Dr. Maurice Gaud, in charge of the African affairs of the Centre, and Dr. Ronald Hargreaves, formerly chief of the section.

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GASTRIC ULCER AND THE ABO BLOOD-GROUPS

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PATIENTS with carcinoma of the stomach are more likely to belong to blood-group A and those with duodenal ulcers to group O than are controls; and patients with gastric ulcers come somewhere in between (Aird et al. 1953, 1954, Clarke et al. 1955, Koster et al. 1955). Koster et al. suggested as an explanation that blood-group A was associated with a tendency for the mucosa of the body of the stomach to atrophy; and that the atrophic mucosa and consequent hypochlorhydria produced a lessened liability to duodenal ulcers and an increased liability to carcinoma.

Scepticism about the association between hypochlorhydria and the origin of gastric carcinoma led us to test this hypothesis by seeing whether blood-group A was in fact associated with carcinoma of the body rather than with carcinoma of the antrum. We could do this because in a series of cases of relatively early carcinoma we had already determined the probable site of origin.

Contrary to what the hypothesis demanded, there was an excess of group O in the carcinomas of the body, and of group A in carcinomas of the antrum (Jennings et al. 1956). These results being only on the borderline of statistical significance, they were not reported until further study showed that simple gastric ulcers behaved in a similar way—i.e., simple ulcers of the antrum tended to be associated with blood-group A, whereas the common gastric ulcer just above the angulus was associated with blood-group O.

Publication of our results was deferred because of criticism of our previous paper by Haddock and McConnell (1956), which led us to restudy our original material together with additional cases seen in 1954–56. Meanwhile Billington (1956a and b) published results which agree closely with ours. It seems possible or probable that the results of Haddock and McConnell differ owing to the difficulty of deciding the site of origin of a gastric carcinoma unless the decision is made at operation by comparing the clinical history and X-ray films with the fresh specimen. In the fixed specimen uninvolved parts of the stomach shrink more than the growth, and consequently lesions of the body often seem to arise only a short distance in front of the pylorus. In other cases, where there has been delay in making a diagnosis, a prepyloric carcinoma may extend upwards to involve much of the body of the stomach.

Material and Methods

Up to July, 1956, 216 partial gastrectomies for gastric ulcer (uncomplicated by a duodenal ulcer or a scar) were indexed in the combined medical and surgical peptic-ulcer clinic, most of them since 1950. The decision whether an ulcer near the sphincter was prepyloric or duodenal was made at the time of operation by the surgeon; or, if he was doubtful, the pathological department was asked to report on the nature of the mucosa above and below the lesion. All ulcers across the sphincter —i.e., with gastric mucosa above and duodenal below— were classified as duodenal.

In 5 of the 216 cases there is no record that the blood-group was determined; 6 patients belonged to groups B and AB; and 13 other cases are omitted because the operation was an emergency one, there had been no previous barium meal, and the site of the ulcer relative to the angulus was uncertain.

The remaining 192 cases were classified into three groups by inspection of X-ray films taken in the erect position. The difficulty of deciding whether an apparent prepyloric ulcer was really a sphincteric or a duodenal one did not arise, because the method of selection ensured that all the ulcers were gastric. Ulcers associated with a "hanging bag" deformity—i.e., ulcers starting at the angulus but eventually drawn towards the pylorus by scarring and contracture of the prepyloric lesser curve— were classified as antral. Other ulcers at the angulus or on the vertical part of the lesser curve were classified as "mid-gastric ulcers." The third group of "high" gastric ulcer consisted of those on the sloping part of the lesser curve below the cardia. No attempt was made to estimate the distance from the cardia in centimetres.

Results and Discussion

In the accompanying table the gastric-ulcer patients are compared with our previously published carcinoma series. At each site in the stomach the relative proportion of blood-groups A and O is similar in simple ulcer and carcinoma, group A being more frequent in antral lesions (A/A + O = 0·7), and group O in lesions of the body (A/A + O = 0·45). In both sexes group A predominates in antral lesions, but the excess of group O in lesions of the body is only found in males. This difference between the sexes in lesions of the body is unexplained and needs confirmation. The few high gastric ulcers and carcinomas of the cardia resemble the antral lesions in showing an excess of group A. These results are similar to those reported by Billington (1956a and b), who did not, however, distinguish between the sexes.

Hitherto it has been thought that gastric carcinoma was associated with group A and peptic ulcer with group O. Our results support Billington's (1956a) suggestion that the important association is between the *site* of the lesion and the blood-group, and that the *nature* of the lesion, whether simple ulcer or carcinoma, is irrelevant. The overall association of carcinoma of the stomach with group A, and of gastric ulcer with group O, results from the fact that most carcinomas occur in the antrum (in lesions of which group A predominates) and most ulcers in the body (in lesions of which group O predominates). The effect of comparing all carcinomas with all ulcers has been to confound a real association between blood-group and the part of the stomach affected, and to produce a spurious association between blood-group and the type of lesion, whether carcinoma or ulcer.

192 GASTRIC ULCERS AND 119 CARCINOMAS OF THE STOMACH CLASSIFIED BY SITE, SEX, AND BLOOD-GROUP

Lesion	Males					Females		
	A		O		Ratio A/A+O	A	O	Ratio A/A+O
Prepyloric ulcer	25	55(43·3)	17	32(43·6)	0·60	4	3	*
Carcinoma of pylorus and antrum	30		15		0·67	12	5	0·70
Midgastric ulcer	37	46(60·6)	57	76(61·3)	0·40	20	11	0·64
Carcinoma of body	9		19		0·32	9	4	0·70
High gastric ulcer	8	16(13·0)†	5	10(13·0)	0·62	2	3	*
Carcinoma of cardia	8		5		0·62	2	1	*
All ulcers	70		79		0·47	26	17	0·60
All carcinoma	47		39		0·55	23	10	0·70
	117		118			49	27	

* Insufficient for calculation.
†Expected figures (in parentheses) based on the hypothesis that there is no relation between site and blood-group:
χ^2 for men alone = 13·3 (2 degrees of freedom) $p < 0·0025$
χ^2 for both sexes = 7·5 (" " " ") $p < 0·025$.

Summary

In 192 patients with gastric ulcer, and 119 patients with carcinoma of the stomach, blood-group A predominated when the lesion was in the pyloric antrum and blood-group O when it was in the body of the stomach.

The association between gastric carcinoma and blood-group A on the one hand, and that between gastric ulcer and blood-group O on the other, may be attributable to the fact that most carcinomas are in the antrum, whereas most gastric ulcers are in the body of the stomach.

We wish to thank Dr. H. B. May, director of the clinical laboratories, for providing the results of the blood-group determinations.

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"Because the problem of nutrition is largely a cultural one, the approach to its solution must be principally through cultural means. But what is the problem of nutrition which we are concerned to solve? It is, surely, how one can get human beings to eat foods which at every stage of their growth and development are those most likely to contribute to their optimum health. . . . No matter how complete our knowledge of the biochemistry, the physiology, and the nutritional value of food may be, unless we attend to the sociopsychologic or cultural factors first we are not likely to succeed in our endeavors."—M. F. ASHLEY MONTAGU, PH.D., *Amer. J. clin. Nutr.* 1957, **5**, 237.

MYASTHENIC CRISIS

THERAPEUTIC USE OF *d*-TUBOCURARINE

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IN the past few years progress has been made in determining the mechanism of the neuromuscular failure in myasthenia gravis. The former concept that a "circulating curare-like substance" was responsible for the neuromuscular block has now been virtually abandoned in favour of an alteration in the response of the motor end-plate to acetylcholine or one of its breakdown products (Churchill-Davidson and Richardson 1953). Recently the work of Grob et al. (1955) has indicated that an abnormal response of the motor end-plate to choline (a derivative of acetylcholine) may be the primary factor.

Since 1934, when Mary Walker introduced the use of physostigmine for the purpose, the treatment of myasthenia has centred on various anti-cholinesterase drugs. Some patients respond more readily than others, and Rowland et al. (1955) have shown that occasionally these drugs, instead of improving the patient's muscle weakness, bring about a rapid deterioration. We describe here a case of this kind and report a new therapy for such patients which is consistent with the present concept of myasthenia.

Case-report

Our patient was a housewife, aged 56, weight 12 st. 3 lb. She was admitted to hospital for investigation.

APRIL, 1954

She had had a drooping right eyelid for three months, slurring speech for two months, and weakness of the jaw for six weeks. These signs were all made worse when she became excited and at the end of the day. The jaw weakness was such that she had to hold her chin up when talking or eating. She could take only semi-solid foods.

Investigations.—No radiological evidence of a mediastinal mass. Serum-creatinine level 0·96 mg. per 100 ml.; serum-creatine 0·35 mg.; serum-cholesterol 118 mg. Hb 84%. Intramuscular neostigmine 2·5 mg. produced dramatic improvement in the muscle weakness. Intravenous decamethonium 2·5 mg. produced peripheral and facial muscle weakness with severe dysphagia and dysphonia. The action potential of the hypothenar muscles (after supramaximal stimulation of the ulnar nerve at the wrist 10 times a second) showed a 10% reduction of the control value. Subsequently, intravenous 'Tensilon' 10 mg. led to a dramatic improvement in the muscle weakness for about two to four minutes.

The reactions are typical of generalised myasthenia gravis in the second or "dual" phase (Churchill-Davidson 1956).

Treatment with pyridostigmine ('Mestinon') 60 mg. four times a day produced good results. After consultation, thymectomy was considered advisable.

MAY, 1954, TO NOVEMBER, 1955

Thymectomy.—The thymus gland was removed in May, 1955, by Mr. N. R. Barrett. It weighed 33·5 g. Microscopy showed "evidence of hyperplasia and atrophy in the mass, but the predominant change was hyperplasia of the large thymus cells. The process appeared to be analogous to nodular hyperplasia in other organs affected by hormones—for example, chronic mastitis. There was no evidence of neoplasm."

Progress.—The patient made an uneventful recovery. Three weeks later she left hospital, considerably improved but taking twice the amount of pyridostigmine that she took before the operation—i.e., 60 mg. two-hourly. She was seen regularly at the follow-up clinic every two months, but during the next fourteen months her condition gradually began to deteriorate despite temporary improvement obtained by increasing the dose of pyridostigmine.

DECEMBER, 1955, TO MARCH, 1956

Readmitted in December, under the care of Dr. H. J. Anderson, she felt "terribly tired" and had a myasthenic facies with considerable drooping of both eyelids.

Treatment.—Neostigmine, 22·5 mg. two-hourly for seven doses daily, led to a temporary improvement lasting three days, but she had to be roused regularly during the night; otherwise she was too weak even to swallow in the morning. Pyridostigmine 120 mg. was again tried as the last dose at night in the hope of getting a more prolonged response, but there was only slight improvement. Then neostigmine 30 mg. two-hourly for eight doses daily was tried, again with temporary improvement.

As increasing doses of neostigmine were not producing any general improvement in muscle strength, and the patient was too ill to undergo thoracotomy, she was given another anti-cholinesterase drug—WIN 8077 (Schwab et al. 1955)—two-hourly in a dosage which gradually increased from 10 mg. initially to 30 mg. two-hourly on the third day. Muscle strength greatly improved on this dosage but was maintained for only about an hour of the two-hour interval between doses; hence, by the time the next dose was due the patient had again become very weak.

Cholinergic Crisis.—On the fourth day after the start of treatment with WIN 8077 the patient suddenly collapsed while on a bedpan. Respirations ceased, and the pulse became feeble. Artificial respiration was begun, and the house-surgeon gave intramuscular neostigmine 2·5 mg. This dose was repeated thirty minutes later, when there was still no sign of spontaneous respiration. The patient was then intubated and maintained on manually controlled respiration with a nitrous-oxide/oxygen mixture. Intravenous tensilon 10 mg. produced no response, and it was then concluded that the patient was probably having a "cholinergic crisis"—i.e., an overdose of anti-cholinesterase drugs (mainly WIN 8077).

Weak respiratory activity returned three hours later, but could be temporarily abolished by intravenous tensilon 10 mg.

No further drugs were given that day. Five hours later the patient breathed spontaneously and appeared to improve after the intravenous injection of tensilon 10 mg.; so neostigmine 2·5 mg. was given intramuscularly. During the next twenty-four hours the patient twice stopped breathing, on each occasion soon after taking neostigmine 22·5 mg. by mouth.

At this point it was decided to withhold anti-cholinesterase drugs for some days and to maintain adequate artificial ventilation.

Tracheotomy was performed under thiopentone/nitrous-oxide/oxygen anæsthesia, and a cuffed tube was inserted. Ventilation was then maintainted with air (supplemented by two litres of oxygen per minute) on a Beaver mark-H respirator. Adequate nourishment and fluids were given through a stomach-tube. Sedation was achieved with amylobarbitone sodium and chlorpromazine.

At the end of ten days on this routine the patient was again given neostigmine 22·5 mg. two-hourly. The response was dramatic. Next day all signs of the ptosis had gone, and she could swallow and talk. She dispensed with the respirator during the day but was not sufficiently confident to do so at night.

Progress.—A week later her morale was high, and the improvement in the myasthenic symptoms was striking, but thrombosis of both deep femoral veins necessitated anti-coagulant therapy. Four weeks later she was able to get out of bed, and for the first time for many months, could see clearly to read the papers, she was able to knit, and write. The tracheotomy tube was withdrawn, and the wound allowed to close.

Seven weeks later she was discharged convalescent, taking neostigmine 22·5 mg. two-hourly for eight doses daily.

MARCH TO JULY 1956

Nine weeks later her myasthenic symptoms started to return; she became very tired, and her left eyelid was drooping again.

She was readmitted to hospital, and gradually over the next few weeks her weakness increased, swallowing became extremely difficult, and her voice was hardly audible. She had to be roused at night to receive tablets because she was otherwise too weak in the early morning. Pyridostigmine was again tried as a substitute for neostigmine as the last

dose at night, but again this only led to some temporary improvement.

Her general condition became so poor owing to continuous salivation and inability to swallow sputum, poor respiratory excursion, and grossly inadequate diet, that it was decided to reinsert the tracheotomy tube and to maintain nourishment through a nasal stomach-tube.

Second Tracheotomy.—Thiopentone 0·15 g. and succinylcholine 40 mg. were given, and respiratory activity was paralysed for four and a half minutes, during and after which respiration was controlled with a nitrous-oxide oxygen mixture through an endotracheal tube up to the time that the tracheotomy tube was inserted.

Progress.—All neostigmine therapy was stopped. On recovering consciousness half an hour later the patient breathed unaided, but four hours later she became cyanosed and very distressed, with poor chest movements. The Beaver respirator was again used. Her jaw became so weak that it had to be permanently supported by a bandage. For the next fourteen days respiration was controlled automatically and adequate nourishment was given through a nasal stomach-tube. Light suction of the trachea and bronchi was performed half-hourly, or whenever necessary.

After a fortnight's treatment the patient was again put back on neostigmine 22·5 mg. two-hourly for seven doses followed by pyridostigmine 120 mg. two hours later. The effect was again impressive. Gradually over the next few days she could do more and more until she was strong enough to get out of bed for a short time, swallow liquids, knit, write, and read the paper. The improvement was maintained for about two weeks and then gradually began to wear off until she again became pitifully weak, being unable to swallow liquids or to breathe adequately without assistance.

The pattern of events became remarkably cyclic: a period of improvement in muscle-power with neostigmine was followed by a gradual deterioration, and then, after a complete rest from drug therapy, a return of the response to neostigmine. It was assumed that the dose of neostigmine used after the initial improvement was repeatedly poisoning her, and it was decided to give her another fourteen days of complete rest from all drug therapy but then to try much smaller doses of neostigmine.

At the end of the fortnight's complete rest, using the Beaver respirator, the patient was given neostigmine 22·5 mg. t.d.s. Again there was an initial improvement in muscle-power, enabling her to close her jaw and swallow liquids; but it lasted only for short periods after swallowing the neostigmine. After a fortnight the initial improvement began to subside. The morale of both patient and attendants was beginning to fall, and desperate measures were now considered necessary.

Thyroid Treatment.—The first was to try to make her thyrotoxic to see if the myasthenic symptoms would improve. After eight days on thyroid extract gr. 10 t.d.s. her personality had greatly changed: she was irritable, weepy, and unable to be pleased. Three days later she became completely unmanageable; so the thyroid treatment was abandoned. During this period there was no sign of any improvement in the myasthenic state.

At this point the patient's morale was very low, and she could only talk feebly while supporting her jaw with her hand. Her diet was entirely fluid because she could not chew or swallow solids, and she seemed completely unable to move her tongue. She could neither knit, write, nor read. Repeated doses of chlorpromazine 50 mg. p.o. and morphine gr. $^1/_8$ were given with heavy barbiturate sedation at night.

AUGUST TO OCTOBER, 1956

(Curare Therapy)

Repeated attempts to "rest" the motor end-plate by withholding neostigmine had led to temporary but clear improvement on three separate occasions. It was decided, therefore, to go one stage further and to attempt complete "rest" of the motor end-plates for a week by screening them from activity by using repeated doses of *d*-tubocurarine.

On Aug. 27 thiopentone 0·3 g. was given, followed by *d*-tubocurarine 15 mg. Amylobarbitone sodium gr. $3^3/_4$ and chlorpromazine 50 mg. were given eight-hourly as general sedation. Respiration was maintained on Beaver respirator (mark II) with an expiratory volume of 450–550 c.cm. per breath at a rate of 12 per min. Muscle paralysis was measured both by the visible signs of movement and by stimulation of the ulnar nerve at the wrist at a twitch rate (i.e., 10 per sec.) and observing the absence of a visible response in the hypothenar muscles. Any sign of returning muscle activity was taken as an indication for a further dose of curare. The degree of consciousness was measured daily with an electroencephalograph and the appearance of alpha rhythm was taken as a guide for increased sedation. In the early stages more frequent electro-encephalographic measurements are advisable. Electrolyte balance, prothrombin-time, urine output, pH, and plasma-bicarbonate level were measured daily.

The intake of fluids averaged 3240 ml. in twenty-four hours. A diet of 1500 calories contained per each 12 oz.:

Protein	105·0 g.	Vitamin B_1	3·9 mg.
Fat	55·0 g.	Riboflavine	3·7 mg.
Carbohydrate	150·0 g.	Nicotinic acid	25·0 mg.
Calcium	2·8 g.	Pantothenic acid	10·0 mg.
Phosphorus	2·7 g.	Choline	250·0 mg.
Sodium	1·3 g.	Pyridoxine	1·4 mg.
Chloride	2·5 g.	Vitamin B_{12}	7·0 µg.
Potassium	3·7 g.	Vitamin C	34·0 mg.
Iron	37·0 mg.	Vitamin D	750·0 units
Vitamin A	3750·0 units	Vitamin E (acetate)	18·0 mg.
		Vitamin K	3·7 mg.

The dosage of curare was as follows:

1st day (7.0 P.M.–midnight)	65 mg.	6th day	90 mg.
2nd day	155 mg.	7th day	115 mg.
3rd day	140 mg.	8th day	60 mg.
4th day	140 mg.	9th day	Nil—respirator continued
5th day	110 mg.		
Total dose of curare			875 mg. in eight days.

8th day: The last dose of *d*-tubocurarine was given at 11.20 A.M. By 5.0 P.M. right thumb and wrist were seen moving. By 7.0 P.M. lower lip and both eyelids were showing weak but vigorous movement. Able to answer questions by squeezing hands. Attempts being made to speak.

9th day: after quiet night now sitting up with eyes wide open. Jaw muscles regaining good tone and able to eat light breakfast. Off respirator for a few hours at a time. Still no neostigmine given.

10th day: remarkable improvement. Able to eat full breakfast, and steak for lunch for first time since admission to hospital. Able to get out of bed unaided but still unsteady on legs. Now off respirator altogether.

11th–20th days: continuous, steady, daily improvement. Without any neostigmine patient now eating better than at any time for two years. Jaw muscles feel firm and eyes are widely open. Knitting, reading, and writing well. Able to walk length of ward slowly but unaided.

21st day: left eyelid notice drooping towards end of day.

22nd–25th days: steady return of myasthenic symptoms, including drooping of eyelids, husky voice, dysphagia, jaw weakness, and general tiredness.

Neostigmine therapy on a reduced scale was started again in the dosage of 22·5 mg. t.d.s. effect was again dramatic: all signs of the myasthenia vanished and the patient could once more eat, see clearly, talk, and walk. During the next week the patient was gradually restored to full confidence. As there were slight myasthenic signs in the late evening, the dose of neostigmine was increased to four times a day.

Four weeks after the end of the curare treatment the patient left for a weekend in the country after having been nearly a year in hospital. After a further week's observation in hospital, during which time her tracheotomy tube was removed, she was finally discharged to her home on Oct. 12.

Condition on Discharge.—She was still on the same dosage of neostigmine, both eyes were widely open at all times and she was eating well, reading, knitting, and talking strongly. There was no apparent weakness of the facial muscles and she smiled freely. Despite her weight of nearly 13 st. she walked well and climbed stairs unaided.

Final Illness.—Unfortunately her only relatives lived in a remote part of Scotland; but in view of what she had already endured, and fully realising the possible consequences, we allowed her to return home. We followed her condition by constant correspondence, from which it appears that her improvement was maintained for a further six weeks, making a total of about three months. After this, first the left eyelid started to droop, and then the jaw muscles became weak again, despite a constant dosage of neostigmine. The general weakness became worse. The patient died quite unexpectedly during the night some three weeks later, from what appeared to be an acute onset of respiratory failure.

Discussion

The main trouble in myasthenia gravis appears to be an alteration in response of the motor end-plates to acetylcholine or one of its breakdown products (Churchill-

Davidson and Richardson 1953). This supposition is supported by the finding of Grob et al. (1955) that choline (a breakdown product of acetylcholine) produces a non-depolarisation block in myasthenic patients—i.e., instead of producing a simple depolarisation of the muscle-fibre as in the normal subject it may produce a prolonged neuromuscular block similar to that produced by *d*-tubocurarine. There is no evidence that the choline of myasthenic patients differs in any way from that in normal subjects; on the contrary, experience with decamethonium suggests that this explanation is very unlikely, because it is not the drug that has changed but the response of the motor end-plate.

The action of neostigmine at the motor end-plate has not been fully established. There is no doubt that its major action is to depress the activity of both the plasma and the true cholinesterase, with the result that the concentration of acetylcholine at the motor end-plate increases. Apart from this, it has an action similar to that of acetylcholine on the motor end-plate and possibly on the muscle-fibre.

The therapeutic value of neostigmine in myasthenia is generally attributed largely to its anti-cholinesterase properties, but this may not be the sole reason for it. Rowland et al. (1955) have shown that, whereas one patient tolerated as much as 2500 mg. a day by mouth, another became extremely weak after receiving 16 mg. intravenously in ninety minutes. This variability in response to neostigmine, not only in different patients but also in the same patient at different times, is characteristic of the disease. The altered response of the motor end-plates might be explained by an alteration in the ratio of acetylcholine molecules to those of choline, the former producing depolarisation during their fleeting life-span, and the latter persisting indefinitely and producing a non-depolarisation block like that of *d*-tubocurarine.

This may help to explain why myasthenic muscle which ceases to respond to neostigmine can be made to respond again if the neostigmine is withheld for a while. The present case illustrates this point well, for the anti-cholinesterase drugs apparently induced a "cholinergic crisis" or respiratory failure. Then, after a suitable rest, neostigmine produced a striking response in muscle-power, but gradually over the next few weeks this response deteriorated. Again, on two separate occasions a rest produced a dramatic improvement, only to be lost a few weeks later. It seems almost certain that it was the neostigmine itself that was gradually producing this deterioration. The gap between the improvement in muscle strength and the period of deterioration due to possible poisoning became narrower and narrower as the therapy continued, only to widen again after a suitable rest; yet a small concentration of neostigmine was essential to normal respiration and fundamental activity.

The fact that the periods of rest were always followed by improvement in the response to anti-cholinesterase therapy led to the next logical step—an even more efficient method of resting the motor end-plates. Conscious patients, even when on a breathing-machine, use their muscles to a limited extent. We assumed that, if such a patient were sedated and completely paralysed, then only a small amount of acetylcholine would be produced at the nerve terminal. The presence of a high concentration of a muscle relaxant—e.g., *d*-tubocurarine—would so raise the excitation threshold of the motor end-plate that the concentration of acetylcholine ions would be insufficient to cause stimulation. Thus the motor end-plate would enjoy a period of complete rest. In such circumstances any substance, whether anti-cholinesterase or choline, that has accumulated at the motor end-plate would be removed. This rather slender hypothesis was the basis for trying what might otherwise be described as dangerous treatment—namely, to give large doses of *d*-tubocurarine to a myasthenic patient. The results justified the attempt.

Six hours after the last dose of *d*-tubocurarine, and without any neostigmine at all, the patient was moving both arms and legs, and within eighteen hours some of the previously myasthenic muscles were showing even more muscle-power than they had ever done before on full neostigmine therapy. This was best exemplified by the patient's being able to eat a full breakfast, and even to chew meat, which she had not been able to do since entering hospital. Both eyelids remained widely open, and the absence of any myasthenic symptoms persisted for about ten days, after which they began to return gradually. At this stage a reduced dosage of neostigmine produced a dramatic response, with the abolition of all myasthenic symptoms. This was maintained far longer, and in a fuller degree, than on any of the three previous occasions, where rest alone had been used.

Those who witnessed the effects of the curare therapy had no doubt of its benefit. These were not maintained indefinitely; but in some patients it should not be impossible to repeat this form of therapy at intervals. Nevertheless, treatment of this kind is dangerous and demands constant medical and nursing attention; it should be undertaken only in units experienced in dealing with long-term respiratory paralysis.

Griffin et al (1956) reported the successful treatment of a severe case of myasthenia by thymectomy in the presence of respiratory insufficiency.

Before the operation the patient was treated by artificial ventilation on an intermittent positive-pressure breathing-machine. This was continued for thirty-five days without any apparent improvement in muscle-power despite varying doses of neostigmine. To make comparison with the present case easier we emphasise that the ventilating machine was so balanced that the patient made the initial respiratory effort himself and the machine then ensured that it was of sufficient volume—i.e., the patient did some of the work. At the end of this time he underwent thymectomy; but after the operation, so that he would be spared postoperative distress, respiration was maintained automatically for four days. On the sixth postoperative day the patient could breathe easily, and after the ninth day the respirator was not needed again.

So striking are some of the resemblances between the case reported by Griffin et al. (1956) and the present case that it is impossible not to ask how much of the effects are due to thymectomy and how much to complete rest. If complete rest alone can bring about a striking improvement, is this why thymectomy sometimes does so?

Another remarkable feature of this case is the absence of evidence of "curare sensitivity" even in a patient with extremely severe myasthenia. The degree of sensitivity described by various workers varies from 10- to 100-fold; but, as this is probably the first published case in which massive doses have been deliberately administered, the absence of any obvious sensitivity reaction is important. Previous tests with both decamethonium and *d*-tubocurarine have shown that it is important, when talking about myasthenic muscle, to differentiate between that which shows clinical weakness and that which does not. Those muscles which are already partially paralysed by the myasthenic process naturally become the first to show increased weakness after the injection of *d*-tubocurarine. On the other hand, it appears that the "apparently unaffected" muscles require a normal dosage level to bring about complete paralysis.

These remarks are based on a single case, but the onset of a "myasthenic crisis" is rare and not easily foretold. If the circumstances warrant it, there seems to be a reasonable theoretical and practical basis for resting the motor end-plates in the manner described. The treatment is hazardous but in ideal conditions is feasible. If more such cases were so treated and successful results obtained, the whole value of thymectomy would need to be carefully reviewed.

Summary

A patient with myasthenia gravis who had undergone thymectomy gradually responded less and less to neostigmine. Various anticholinesterases were tried, but the patient finally collapsed apparently from excessive drug therapy.

Complete withdrawal of all neostigmine-like drugs for seven days led, on resumption of therapy, to much improvement. This, however, was maintained for only a few days before severe myasthenia again became evident.

Large doses of *d*-tubocurarine, which provided complete rest for the motor end-plates, led to a dramatic improvement, which was sustained with the aid of reduced neostigmine therapy for nearly three months.

The implications underlying this form of treatment are discussed.

We want to record our sincere appreciation of the advice and encouragement we received from Mr. N. R. Barrett, under whose care the patient was admitted, and also from Dr. H. J. Anderson and Dr. R. Kelly. We emphasise our admiration for the nursing care by Sister R. Stephenson and her staff. We are indebted to Dr. R. S. Schwab for the supplies of WIN 8077. This work was carried out with the help of a grant from the endowment fund of St.Thomas's Hospital.

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Preliminary Communication

A pH-ENDORADIOSONDE

As a means of obtaining information from the digestive tract, the use of a small radio transmitter, which the patient can swallow, has two advantages: (1) that its presence is not noticed by the patient, and (2) that it provides information that cannot be got in any other way. We have recently described a unit which simultaneously transmits pressure and temperature data during its passage through the alimentary canal.[1]

In designing a unit that would similarly transmit information about hydrogen-ion concentration, we found that the high impedance of glass electrodes is a disadvantage in connection with the low input-impedance of most transistor circuits. With the transistors available in this country, we have not been able to construct a small enough endoradiosonde for telemetering pH with a glass electrode.

It seems necessary to employ at least two transistors and some sort of high input-impedance feedback circuit (e.g., the input transistor common-collector coupled and another as a radio frequency oscillator). Such endoradiosondes can eventually be constructed, since the active elements in present transistors constitute only a small fraction of their total physical volume. The advantages of a glass-electrode pH-unit are rapid response and high accuracy.

The endoradiosonde described here embodies a mechano-chemical transducer that changes its dimensions with pH. Certain polymers have the property of expansion and contraction with pH changes.[2] A copolymer of 20% polyacrylic acid and 80% polyvinyl alcohol gives a reversible change in physical dimensions of 60% for a shift of pH from 3 to 8. After formation by vulcanisation under tension at 80°C for thirty minutes it is insoluble in body-fluids. A foil having a dry thickness of 0·05 cm. gives an 80% response in twenty minutes, thinner films being faster. This copolymer has good mechanical strength, unlike some others having larger expansion and contraction properties. Polymethacrylic acid gels, for example, are less suitable as transducors, because they are weak.

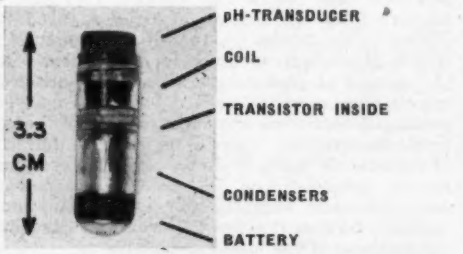

Fig. 1—Radiosonde to be swallowed to transmit pH-readings during its passage through the gastro-intestinal tract. (Actual size.) The battery drives the unit continuously for fourteen days.

In principle, an osmotic method using the motion of the interface between two opposing dialysing bags would be more sensitive in specified pH-ranges and possibly faster. But in an experiment in which one bag contained a cellulose derivative soluble in acid, and the other bag contained one soluble in basic solution, the results were less satisfactory than with the copolymer transducer, because of sensitivity to electrolyte concentration.

The change of mechanical dimension of the pH-sensitive element is transferred to an iron core moving inside a coil constituting the inductance of a transistor oscillator. The circuit and construction of this oscillator are similar to that of the unit for measuring pressure and temperature.[1] (Since simultaneous temperature measurement was not considered of interest in these preliminary experiments, the mode of operation of the 400-kilocycle oscillator was such as to give non-quenched oscillation. This was achieved by making the turns ratio of the 500-turn coil 1 : 10.) The change of position of the iron core causes the frequency of the oscillator to shift. Thus the pH is telemetered as a frequency modulated signal. A limp second diaphragm over another opening in the capsule can render the unit insensitive to pressure changes in the abdomen.

The radio signal is picked up by a small loop antenna connected to a standard radio receiver. The tuning of the receiver thus gives information of the pH value in the gastro-intestinal tract. One can track the endoradiosonde through the body with the antenna or, for more accuracy, by X-ray observation.

With this unit we have been able to observe the shift in pH from acid in reaction in the stomach towards alkaline in the intestine. The slow response time of the copolymer seems not to obviate its use since the speed of pH changes is usually of less importance than the actual final values. The accuracy of the unit has not yet been thoroughly investigated in conditions where the electrolyte concentration is much different from that in the calibration liquids.

The mechano-chemical transducer unit has a length of 0·5 cm. and the endoradiosonde with this attached has a total length of 3·3 cm. The diameter is 0·9 cm., like that of the unit for pressure and temperature.

We are indebted to Dr. Birger Blombäck and Dr. Victor Mutt for valuable suggestions. This work was performed while one of us (R. S. M.) was on leave from the University of California Medical Center as a Guggenheim fellow.

Karolinska Institutet, Stockholm 60, Sweden

BERTIL JACOBSON
R. STUART MACKAY

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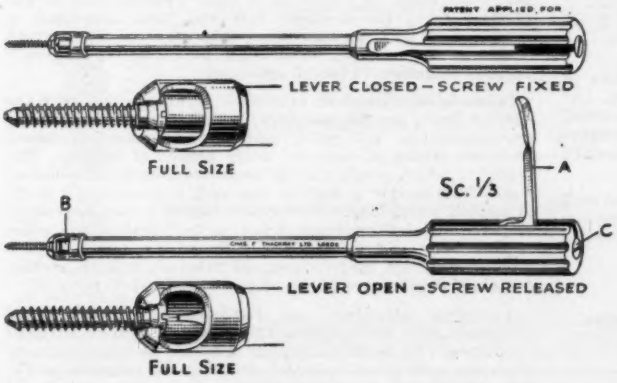
New Inventions

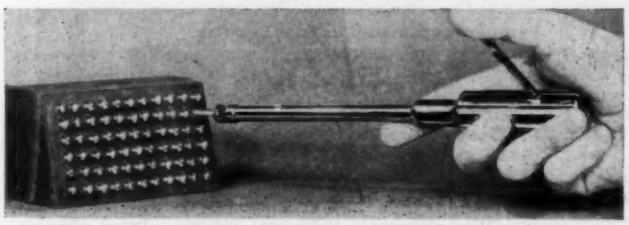
AN IMPROVED SCREWDRIVER

ALL the self-holding screwdrivers now in use have the disadvantage that they need three hands to load them. With the instruments here described, screws can be loaded single-handed and with far greater speed. These instruments have been in constant use by myself and other surgeons over the past four years and have proved extremely satisfactory.

The screwdriver is an adaption of the Burns pattern, in which the screw-fixing device at the base of the handle has been replaced by a quick-action lever recessed into the handle.

All the usual standard screws, such as Sherman's or Lane's pattern, can be used with this instrument (up to $^{5}/_{32}$ in. external diameter of thread with head diameter of $^{5}/_{16}$ in.),





for the shaped tubular shaft at the distal end has been made to suit a wide variation of shapes of screw head.

After the screw has been inserted to the required depth and the screwdriver removed from the screw head, it is possible to drive the screw fully home with the same instrument by merely closing the lever; the end of the tubular shaft is concave externally to accommodate the top of the screw head. A special feature is an adjusting-screw in the base of the handle. This permits the lever to be set to give a firm fixation of the screw head, and once set, it is not necessary to alter it unless a screw with a larger or smaller head is required.

All parts of the instruments are made of stainless steel, except the handle, which is anodised aluminium. The illustration shows the screwdriver being loaded for use.

To avoid the difficulties associated with holding the screws in forceps to load them into the screwdriver, it has been found useful to mount them on a solid block of duralumin drilled to receive six screws of each size, ranging from $^{3}/_{8}$ in. to 2 in., with the heads protruding. When this "screw bank" is loaded, the whole can be easily sterilised by boiling.

My thanks are due to Mr. A. B. Hallam of Messrs. Thackray, who was responsible for the technical details involved in the construction of these instruments.

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PETER WILLIAMS
M.B. Melb., F.R.C.S., F.R.A.C.S.

AN ADAPTABLE WARD BED

A STANDARD WARD BED ADAPTABLE FOR THE UNCONSCIOUS, DISTURBED, OR CHRONIC SICK

THIS bed was developed at Napsbury Hospital for patients having Sakel's insulin-coma therapy, and has been in use for over a year. It is an attempt to meet the ward situation where permanent "cot-beds" are undesirable yet additional facilities may help in nursing the unconscious or restless patient.

Insulin treatment involves the patient in a daily period of coma and recovery. There are particular risks in precarious metabolism, physical restlessness, and a confused (and often disturbed) mental state. Besides appropriate nursing, management entails nasal feeding, intravenous injections, and, at times, electroconvulsive therapy. The medical team is often numerically small, and is simultaneously seeking to provide an understanding and careful relationship where purely restrictive physical handling is minimal. These specific problems are seen in the insulin unit, but they arise in differing contexts throughout general and mental hospital practice.

Fig. 1 shows the bed for use as a standard ward bed and the means of fitting the end-pieces to the frame. Unlocking and removing the foot-bow and head-piece converts the bed to a trolley, permitting easy access to the patient, particularly from the head—e.g., during nasal feeding and electroconvulsive therapy. The sliding tray under the head provides a surface for instruments, &c. It draws out on either side with stops to prevent over-extension. The bed is fitted with a standard wheeling device at the foot, and with individually locking wheels at the head.

Fig. 2 shows both padded ends and one padded side in position. After removal of the arm-rest, fitting the second padded side completes the cot. The padded ends fit and lock in the same way as the foot-bow and head-piece. The padded sides run in gutters at either side of the end-pieces. The sides and ends are interchangeable between beds, making it possible to use one set of padded ends and sides in conjunction with a number of bed-frames.

The cot provides a relatively draught-free space where the necessity for protective handling (which provokes restlessness) is considerably reduced. The top of the padded side is 3 ft. 8 in. above the floor and allows a nurse of somewhat under average height to give nursing attention (other than lifting the patient) without removing the sides. With adjacent sides removed, two cots can be fitted together by means of the staples shown, making a protective pen about 6 ft. square.

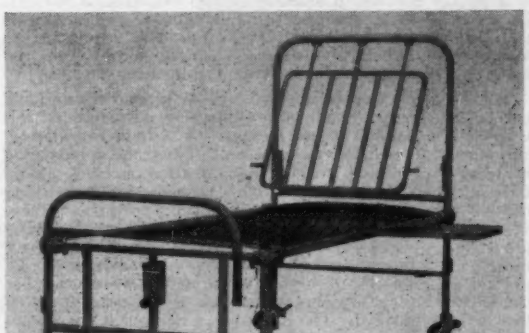

Fig. 1.

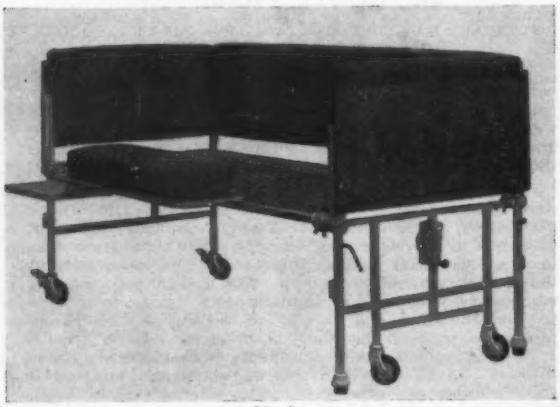

Fig. 2.

The arm-rest fits by means of pegs into either side of the bed-frame. It is padded level with the mattress. At the head end there is provision for fitting an aneroid sphygmomanometer, and at the foot a space for a kidney-dish. The bed can be tilted by means of a standard tilting frame.

I should like to thank the Medical Superintendent and staff at Napsbury Hospital for their help and interest, and acknowledge the proficiency of Messrs. S. B. Whitfield in converting the prototype to a "production model."

The Tavistock Clinic, London, W.1

A. R. WILSON
B.M. Oxfd
Formerly Registrar, Napsbury Hospital

Reviews of Books

Practical Forensic Medicine

FRANCIS E. CAMPS, M.D., reader in forensic medicine London Hospital Medical College; W. BENTLEY PURCHASE, C.B.E., M.C., M.B., barrister-at-law, coroner for the Royal Household and the county of London. London: Hutchinson's Medical Publications. 1956. Pp. 541. 75*s*.

IN a preface the authors say that they write "to give medical practitioners . . . and others . . . a fair idea of what the subject comprises." They have not been as comprehensive as this suggests, and that may be fortunate since the subject is, as they remark, already well documented. What the book has done is to make a novel and partly successful assault on the established format. It starts with A for abortion, accidents, and alcoholic intoxication, and proceeds through the alphabet to W for wounds. It then embarks on toxicology, but discards the alphabetical order for a collectanea.

There is much that is practical and useful, and the authors' enthusiasm for their subject is apparent. Because of this enthusiasm perhaps, some sections are handled brilliantly and illustrated well, leaving others either inadequately treated or frankly neglected. Thus, identification receives nearly 50 pages of sound and absorbing interest, but perplexing deaths in infancy—an everyday problem—are given a bare 10 and the medicolegal necropsy gets only 2. Barbiturates are generously treated, but there is nothing about the current menace of tranquillisers, and the danger of potentiation by alcohol is summarily dismissed. The text is uneven, so that thoughtful and practical passages are followed by material less skilfully handled. The English is forthright if not always elegant though most readers will know what is meant by the "time taken for a body to be skeletonised," "any law of local force," or "she was inflated with oxygen."

Nevertheless, this is a refreshingly new approach, which reflects the authors' wide knowledge of legal medicine in a way that the occasional forensic pathologist will find most helpful. An index would have avoided the frustration of searching for the information that the book undoubtedly contains, but that is the only really unpractical feature of this attractive work.

Physiologic Principles of Surgery

Editors: L. M. ZIMMERMAN, M.D., professor and chairman of the department of surgery, Chicago Medical School; R. LEVINE, M.D., chairman, department of medicine, and director, department of metabolic and endocrine research, Medical Research Institute, Michael Reese Hospital. Philadelphia and London: W. B. Saunders. 1957. Pp. 988. 105*s*.

ALTHOUGH its main roots remain in anatomy and pathology, modern surgical thought and practice is increasingly concerned with disturbances of function, as seen both in disease processes and as a result of surgical procedures themselves. Consideration of such problems must be based on a clear appreciation of the physiology of the systems involved, and this book is intended as an "authoritative statement of the current status of the various physiologic problems in surgery." In this intention it largely succeeds.

Separate sections, each written by an expert, deal with the various basic, general problems, such as hæmorrhage, tissue transplantation, and pain, and all the more specialised problems arising in each and every branch of surgery. The extent to which purely clinical considerations are emphasised varies from section to section, but each is essentially a study in applied physiology. The book contains a vast amount of valuable detailed information not to be found in any other single volume, and deals fully with the great range of subjects now covered by modern surgical research. Each section contains full references to the subject concerned.

Focusing attention on fundamental physiological processes, this volume is a valuable addition to surgical literature. It is of particular interest to postgraduate students and those engaged in surgical research work, but practising surgeons should find here much of interest and value to them.

Family and Kinship in East London

A Survey by the Institute of Community Studies. MICHAEL YOUNG and PETER WILLMOTT. London: Routledge & Kegan Paul. 1957. Pp. 232. 25*s*.

THE first of a series of reports to be issued by the Institute of Community Studies, this survey deals with the effect on family life of the new housing-estates which have been built in their hundreds since the war. The first part of the book studies the close kinship, the intimate family and living conditions in Bethnal Green, with Mum always close at hand. The second part discusses the effects of moving to a new housing-estate, Greenleigh, a few miles away, where the young family is very much on its own and where the common complaint is that other residents are unfriendly and snobbish.

The authors conclude that most residents in Bethnal Green, tied to the district by time and by a lasting attachment to their families, wish to continue to live in the East End. They believe that the authorities should do more than they are at present doing to enable them to continue to do so, rather than insisting that more thousands should migrate beyond the city; and that if the authorities regard community spirit as an asset worth preserving, they should build new houses around the social groups to which the people already belong.

Treves' Surgical Applied Anatomy (13th ed. London: Cassell. 1957. Pp. 591. 30*s*.).—The first edition of this book appeared in 1883; so it is the oldest textbook of surgical anatomy in English still in current use. It is a tribute to the practical wisdom and literary skill of the original author and of subsequent editors that it should also be one of the best. Prof. Lambert Rogers is responsible for the latest edition. It is more than a safe guide through the finals: with its wealth of clinical information, it fulfils the wish, expressed in the preface to the first edition that "it should make the dry bones live." This edition is unlikely to be the last.

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Med. Press, 1954 (Feb. 3), p. 112

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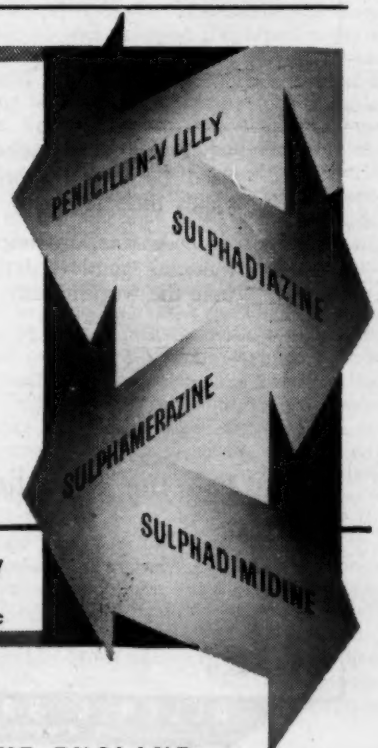

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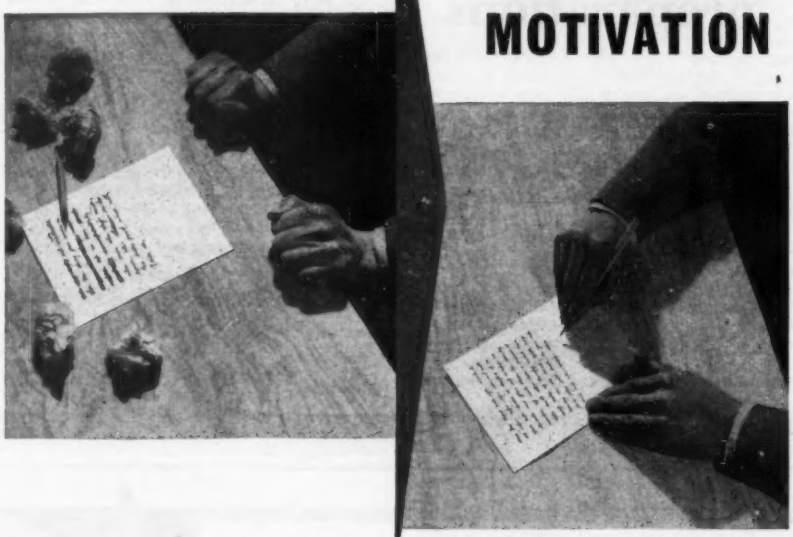

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LONDON: SATURDAY, JUNE 15, 1957

Polyarteritis Nodosa

CORTISONE and corticotrophin were the first agents reported to have a convincing effect on polyarteritis nodosa.[1 2] But the important question whether cortisone prolongs survival remained unanswered, and a panel of the Medical Research Council has sought to resolve this by a controlled therapeutic trial. The task presented serious difficulties and the outcome has been somewhat disappointing. The panel rightly decided that it would be ethically wrong to adopt the procedure (used in therapeutic trials in less lethal diseases) in which selected patients are allocated at random to treated and control groups. The only alternative was to treat all patients fulfilling the criteria for diagnosis, and to compare their fates with those of patients selected retrospectively on the same criteria. The scarcity of cases made it necessary to collate observations made by a large number of physicians in many hospitals. Complete suppression of the disease was the goal, and the dosage of cortisone was limited only by the need to avoid intolerable side-effects. The analysis of the results of the first year of the trial[3] is based on 17 cases in which the diagnosis was made and treatment started in 1950. The untreated control series consisted of 19 patients, from the same hospitals, in whom the disease had started between 1941 and 1950. The two groups were similar in all major respects, with the important exception that hypertension was very much more common in the untreated group (42% at the time of diagnostic biopsy) than in the treated group (6%). The prognosis is much worse in hypertensive patients, and it is not surprising that only 7 of the 19 untreated patients were still alive a year after diagnosis; of the 17 treated patients, 14 were still alive. Thus the untreated group failed to provide a satisfactory control for the treated group, and no firm conclusion could be reached about the efficacy of cortisone in prolonging life. It was concluded that "assessment of therapeutic activity by the use of retrospective controls is an inherently fallacious method and no substitute for the strictly controlled clinical trial."

In patients severely ill with polyarteritis nodosa the initial effects of cortisone were always definite and often dramatic. Within two or three days fever abated, appetite and well-being improved, and pains in joints and muscles decreased. But complete clinical remission and maintenance of a normal erythrocyte-sedimentation rate were rarely achieved—for example, in only 3 of the 15 survivors during the seventh and eighth months of treatment. But the dosage used varied, and truly suppressive doses (which may be as high as 300–500 mg. daily) were not always given. At such high doses, gross features of Cushing's syndrome appeared, and in one patient a gastric ulcer perforated; in a second patient, taking 300 mg. of cortisone daily, a duodenal ulcer developed, but healed without any change in the dosage. During treatment, the blood-pressure rose in the sole hypertensive patient, and 5 other patients became hypertensive—1 died with malignant hypertension. It was impossible to decide whether the increase in pressure in these patients was due to specific renal lesions (for which there was evidence in 4) or to cortisone.

The collection of untreated control cases for the M.R.C. panel was undertaken by Dr. G. A. ROSE, and this part of the investigation yielded some important data on the natural history of polyarteritis nodosa, gleaned from 104 case-records. In their analysis ROSE and SPENCER[4] distinguished a group of cases with involvement of the lungs and other special features. Indeed, the presence or absence of lung lesions seemed to be a more useful basis for classification than the size of vessels involved or the separate types of vasculitis distinguished by ZEEK.[5] The features common to the 14 patients with pulmonary polyarteritis (and much less common in the remainder) included a respiratory illness initiating the disease, the presence in various viscera of unusual necrotising and granulomatous lesions, and mucosal ulceration of the alimentary tract and trachea. In a further 18 cases, pulmonary arteritis was not seen (necropsy material was inadequate in some), but the presence of the remaining special features justified their inclusion in the same "lung-involvement" group. The granulomatous lesions in these cases were found in sites remote from arteries. High eosinophil-counts in the blood (1500 or more cells per c.mm.) and polyarterial lesions containing giant cells or many eosinophils were commoner in this group, and nasal and middle-ear granulomas were never seen when the lungs were not involved. The initial respiratory illness was classed as bronchitic, pneumonic, or asthmatic. Even at this early stage it was often clear that the illness was not a straightforward one. Patients with a bronchitic illness often lost weight steadily and general weakness became prominent. Pneumonic cases ran a rather chronic course, with productive cough, pleuritic pain, and hæmoptysis; antibiotics were ineffective. Asthmatic attacks were frequent and severe, usually with eosinophilia in the peripheral blood. In two-thirds of these cases, over a year elapsed before systemic polyarteritis nodosa became manifest. The onset of the respiratory phase was often insidious, but in the systemic phase deterioration was rapid and the course shorter than it was when there was no initial involvement of the lungs. This rapid progression of the systemic phase may explain why patients with lung involvement are less prone to hypertension than those with more slowly progressive disease without respiratory features, though an apparently identical glomerulitis was seen in both groups.

1. Rose, B., Parc, J. A. P., Pump, K. K., Stanford, R. L. *Canad. med. Ass. J.* 1950, **62**, 6.
2. Shick, R. M., Baggenstoss, A. H., Fuller, B. F., Polley, H. F. *Minn. Med.* 1951, **34**, 852.
3. Report to the Medical Research Council by the Collagen Diseases and Hypersensitivity Panel. *Brit. med. J.* March 16, 1957, p. 608.
4. Rose, G. A., Spencer, H. *Quart. J. Med.* 1957, **26**, 43.
5. Zeek, P. M. *Amer. J. clin. Path.* 1952, **22**, 777.

Small series of polyarteritis nodosa with lesions in the lungs have been reported in the past, but the other distinctive features of such cases have not always been appreciated. CHURG and STRAUSS [6] described fully the non-arterial granulomas present in 13 out of 14 cases with asthma, eosinophilia, and polyarteritis; and they gave the name "allergic granulomatosis and angiitis" to what they considered to be a syndrome distinct from polyarteritis nodosa. It seems clear, however, that granulomatous lesions, though restricted to cases with involvement of the lungs, are not necessarily associated with asthma. ZEEK and her colleagues [5 7] distinguished "hypersensitivity angiitis" from classical polyarteritis nodosa, but ROSE and SPENCER found no cases in their series which fulfilled the criteria for this syndrome.

ROSE and SPENCER extracted from their case-records information which might form the basis of a future specific inquiry into the ætiology of polyarteritis nodosa. Attempts have been made in the past to implicate various drugs, but the symptoms which prompt the giving of a drug may be those of early polyarteritis, or of an infection which is the true cause of the ensuing vascular disease. Perhaps the most suggestive evidence was that which linked polyarteritis nodosa with respiratory infections (especially those due to β-hæmolytic streptococci) and their treatment with sulphonamides. In nearly all the reported cases in which an association between a sulphonamide drug and polyarteritis has been suspected, the drug has been given for a respiratory infection. The sputum had been cultured in 22 cases, and in 5 of these β-hæmolytic streptococci were isolated—a finding which would be unexpected in uncomplicated bronchitis. Moreover, 12·5% of the patients had active rheumatic fever or a history of an attack—a link with the streptococcus which others have noticed.[8 9] Evidence against a drug was clearest in the case of thiouracil and other antithyroid drugs, but it seemed that thiouracil polyarteritis might differ from ordinary polyarteritis nodosa. ROSE and SPENCER make a plea for including in the investigation of cases of polyarteritis nodosa an accurate account of any recent drug administration and an early search for cultural or serological evidence of recent β-hæmolytic streptococcal infection. As in patients with recurrent rheumatic fever, prompt treatment of any acute throat infection may well be important in polyarteritis nodosa.

ROSE and SPENCER believe that the hypertension is a sequel of renal polyarteritis or glomerulitis, but that the arterial pressure rises only during the healing stages of these lesions. More than half the patients with adequate records of arterial pressure had normal readings throughout their illness and at necropsy tended to have glomerular lesions of recent origin. Patients who were hypertensive throughout, or became hypertensive, usually had chronic glomerulitis or healed renal polyarteritis. Rises in arterial pressure were found only after proteinuria or hæmaturia had developed. ROSE and SPENCER conclude that the hypertension is nearly always a result of the polyarteritis nodosa and not a precursor.

6. Churg, J., Strauss, L. *Amer. J. Path.* 1951, **27**, 277.
7. Knowles, H. C., Zeek, P. M., Blankenhorn, M. A. *Arch. intern. Med.* 1953, **92**, 789.
8. Ophüls, W. *Ibid*, 1923, **32**, 870.
9. Friedberg, C. K., Gross, L. *Ibid*, 1934, **54**, 170.

The Endocrine Complex

WITH some reason the anterior pituitary has been allotted a prominent position in the hierarchy of endocrine glands. Thus, it is believed to form at least six hormones—thyrotrophic (T.S.H.), adrenocorticotrophic (A.C.T.H., corticotrophin), follicle-stimulating (F.S.H.), luteotropic (L.H.), mammotrophic (prolactin), and growth (G.H.). Five of these substances are known to be directly concerned in regulating other endocrine glands, and the sixth (G.H.) appears to be important for the growth and maintenance of all tissues. The parathyroids and thymus seem to be independent of the anterior pituitary, though their actions are obviously modified by its absence, owing to a general disturbance of all functions. Intensive research has partly elucidated the functions of the endocrines and, because of this and the availability of hormones such as cortisone, it has become feasible to remove, for therapeutic purposes, apparently normal pituitary glands. This operation has underlined the urgent need for yet more information about endocrine functions and interconnections, partly in order to determine when the operation will be beneficial, and partly to obviate the need for this heroic and blunderbuss method—hypophysectomy offers only temporary respite from the progress of cancer of the breast and is useless against cancer at many other sites. More information is needed, too, in order to help patients with so-called simple endocrine disorders.

The rationale of hypophysectomy for breast cancer lies in the endocrine control of mammary growth, about which there is now agreement on general principles.[1–4] Observations on animals after removal of one or more of the anterior pituitary, adrenals, and ovaries has shown that moderate doses of œstrogens induce growth of the mammary ducts, and that œstrogen plus progesterone given in a ratio of about 1 : 30 induces lobular-alveolar growth, but that œstrogen and progesterone are ineffective in the absence of the anterior pituitary. In unoperated animals a combination of œstrogen and prolactin leads to lobular-alveolar growth since prolactin is itself luteotrophic, and therefore promotes the production of progesterone. If to an otherwise normal animal enough œstrogen is given to cause pseudo-pregnancy, again mammary development is seen because the œstrogen stimulates the anterior pituitary which releases prolactin, and this stimulates the release of progesterone, so that once more these three substances are present. Thus, œstrogen and progesterone from the ovary and prolactin from the anterior pituitary are necessary for the development of the mammary glands. The prolactin has a dual rôle in stimulating the production of progesterone from the corpus luteum of the ovary, and in exerting some other and more directly growth-promoting function, since œstrogen and progesterone together are inadequate. It is not known whether in its non-luteotrophic activity prolactin directly stimulates the mammary glands or influences metabolic processes in a general way; the former is a possibility since in an animal

1. Folley, S. J. *In* Ciba Foundation Colloquia on Endocrinology. London, 1952; vol. 4, p. 381.
2. Folley, S. J. The Physiology and Biochemistry of Lactation. Edinburgh, 1956.
3. Lyons, W. R. *Proc. Soc. exp. Biol., N.Y.* 1942, **51**, 308.
4. Nielson, W. O. *In* Ciba Foundation Colloquia on Endocrinology. London, 1952; vol. 4, p. 402.

previously treated with œstrogen and progesterone prolactin injected into one milk duct has a well-localised action.[3] Mammary growth can be induced even in the absence of adrenal cortical tissue, but, not surprisingly, growth is more nearly normal if the tissues receive their proper quota of both adrenal steroids and G.H. In the absence of the ovaries the adrenal cortex produces ovarian hormones, so ovariectomy alone will not deprive a malignant breast growth of its needed hormones for more than a short time. The exact part played by G.H. is still little understood.[5] All these observations point to the importance of the anterior pituitary. Some recent work [6] suggests that the posterior lobe, too, may have to be drawn in, since there is evidence that one of its hormones—oxytocin—causes the release of prolactin. In addition, the thyroid has to be considered owing to the observation that patients with hypothyroidism are more prone than patients with hyperthyroidism to cancer of the breast and genital organs This may be compared with the observation of TRENTIN et al.[7] that in rats after thyroidectomy the mammary glands are particularly sensitive to the effects of œstrogen and progesterone. From all this it is clear that the actions of a hormone cannot be considered in isolation, but only in the context of other hormones.

In the hitherto vain attempt to establish which patients will benefit from hypophysectomy, several interesting facts have come to light—for instance, that the excretion of œstrogens continues after ovariectomy and is not necessarily abolished by subsequent adrenalectomy and even, in some cases, hypophysectomy.[8] This means either that the so-called hormone-independent growths are perhaps not really independent, or that in some people there is accessory anterior pituitary tissue which is active throughout life or becomes so after removal of the anterior lobe. Anatomical evidence of accessory tissue was described by BOYD,[9] who examined the region of the roof of the nasopharynx, from which the anterior lobe develops embryologically, and found groups of cells resembling differentiated anterior-lobe cells. Another point of interest is the rate of atrophy of those endocrines which depend largely on anterior-lobe hormones for their activity: thus, vaginal smears suggest that the ovaries atrophy in about 4 weeks, urinary excretion of gonadotrophin ceases in 2 weeks to 3 months, and clinical myxœdema appears in 1 to 6 months.[10] This is roughly what might have been expected from observations in other species.

The object of hypophysectomy in the treatment of cancer is to reduce the output of G.H., corticotrophin, and gonadotrophins. RUSSELL [11] suggested that this object might be achieved no less certainly by low-stalk section, which is much simpler than total removal of the gland. The arterial supply of the anterior lobe of the pituitary is interesting in that all the capillaries are second-group capillaries arising from vessels which are derived from a mass of first-group capillaries lying either in the hypothalamus or in the tissue of nervous origin low down in the pituitary stalk.[12] A mid-stalk section results in reduction of anterior-lobe volume by as much as 68–83%,[13] but this leaves more than enough pituitary tissue to maintain other glands in working condition.[14] In two of the three clinical cases considered by RUSSELL, low-stalk section led to complete necrosis of the anterior lobe, presumably because even the most ventral supply vessels had been divided. Experience alone can show whether this simpler operation is adequate.

Besides the interactions of the endocrine system already considered, some others are well recognised, such as the control of T.S.H. and corticotrophin release by the activity induced in the target organs; thus, the amount of circulating adrenal steroids and thyroxine is directly related to the amount of corticotrophin and T.S.H. liberated. Other less well-known relationships are now being found. It has been noted clinically and histologically [15] that absence of adrenal cortical steroids may be accompanied by thyroid hypertrophy. Recently it has been shown that there is sometimes an inverse relationship between corticotrophin and T.S.H. release.[16] Certain types of stress, surgical trauma, or hæmorrhage, which are known to cause the release of corticotrophin, inhibit the rate of release of ^{131}I from the thyroid—i.e., less thyroid hormone is liberated. This inhibition occurs even when the thyroid gland is denervated and also after adrenalectomy, and must, therefore, depend on central nervous system influences, and the likeliest route by which these can affect the thyroid is by alterations in secretion of T.S.H. from the anterior pituitary.[16] A similar inhibition occurs on administration of fairly large doses of corticotrophin and cortisone. On the other hand, in Addison's disease and in adrenalectomised animals small doses of cortisone may increase thyroid activity.[17] Though its mechanism is unknown, this reversed action is understandable since in the patient with Addison's disease thyroid function is below par owing to the absence of a substance necessary for normal cell activity, whereas the situation is quite different when the concentration of adrenal steroids is raised above normal in a healthy animal.

Events in the central nervous system profoundly affect endocrine activity—usually by means of hormones liberated from the anterior pituitary, and rarely by direct nerve stimuli as in the adrenal medulla. It is generally believed that the anterior lobe has no secreto-motor supply and must therefore be influenced by hormones. Some of these, such as adrenal steroids and thyroxine, come from the peripheral organs; but what, if anything,[18] is released from the central nervous system to affect anterior-lobe activity is unknown. A vascular path for such a substance exists in the double capillary system already mentioned, the first part of which lies in nervous tissue and leads via the so-called portal vessels to the second part in the substance of the anterior lobe. It is clear

5. Smith, R. W. jun., Gaebler, O. H., Long, C. N. H. The Hypophyseal Growth Hormones, Nature and Actions. New York, 1955.
6. Bensen, G. K., Folley, S. J. *J. Endocrin.* 1957, **14**, xi.
7. Trentin, J. J., Hurst, V., Turner, C. W. *Proc. Soc. exp. Biol., N.Y.* 1948, **67**, 461.
8. Bulbrook, R. D., Greenwood, F. C. *Brit. med. J.* March 23, 1957, pp. 662, 666.
9. Boyd, J. D. *J. Endocrin.* 1956, **14**, 66.
10. *Lancet*, March 9, 1957, p. 515.
11. Russell, D. S. *Ibid*, 1956, **i**, 466.
12. Xuereb, G. P., Prichard, M. M. L., Daniel, P. M. *Quart. J. exp. Physiol.* 1954, **39**, 199, 219.
13. Campbell, H. J., Harris, G. W. *J. Physiol.* 1957, **136**, 333.
14. Ganong, W. F., Hume, D. M. *Endocrinology*, 1954, **55**, 474.
15. Kracht, J. *Acta endocr., Copenhagen*, 1954, **15**, 355.
16. Brown-Grant, K., Harris, G. W., Reichlin, S. *J. Physiol.* 1957, **136**, 364.
17. Hill, S. R., Reiss, R. S., Forsham, P. H., Thorn, G. W. *J. clin. Endocrin.* 1950, **10**, 1375.
18. Thomson, A. P. D., Zuckerman, S. *Nature, Lond.* 1953, **171**, 970.

that the proper continuity of this vascular link is important for some aspects of pituitary activity. For example, if this path is cut or the anterior lobe transplanted to another site, eosinopenia still follows stimuli which can be classed as systemic, but not those which can be called neurotropic.[19] Also, in animals the weights of the ovaries are directly correlated with the presence of the vascular connections between the hypothalamus and the anterior lobe.[19] With regard to the thyroid

> "it may be concluded that the pituitary divorced from anatomical connection with the hypothalamus retains a residuum of autonomous activity with regard to the secretion of the thyrotrophic hormone and that this activity can be inhibited in an apparently normal way by a raised blood level of thyroid hormone and by the stress of physical trauma. The function of the hypothalamus in relation to T.S.H. secretion seems to be to *maintain* the normal rate of secretion and to *modify* this rate of release in response to stimuli acting through the central nervous system." [19]

That is to say, the activity of the anterior lobe is modified by both the central nervous system and the blood concentration of thyroid hormone. Whatever view is held of the mode of control of the anterior pituitary, it is clear that even a successful graft does not function as satisfactorily as the gland in its proper position in relation to the hypothalamus.

The last aspect of the problem is the one about which we know the least, but on which much work is now being done—that is, the action of the various hormones on the nervous system.[20] That hormones do affect the nervous system is evident from cases of hyperthyroidism or hypothyroidism, premenstrual tension, and other disorders. The possible modes of action are many, from changes in activity of one or more cellular enzyme systems and changes in intracellular and extracellular electrolytes and water concentration to alterations in ease of synaptic transmission between some types or groups of neurones whose activity specifically affects the anterior lobe. That man can live without an interior lobe but with a modicum of substitution therapy shows that for all his complexity he has remarkable powers of adaptation.

19. Fortier, C., Harris, G. W., McDonald, R. *J. Physiol.* 1957, **136**, 344.

20. Hoagland, H. Hormones, Brain Function, and Behaviour. New York, 1957.

Annotations

CIGARETTE-SMOKING AND RESPIRATORY DISEASE

Doll and Hill [1] found an association between smoking and lung cancer, Lowe [2] one between smoking and respiratory tuberculosis, and Leese [3] one between smoking and chronic bronchitis. Edwards [4] now describes an analysis of the relationship between cigarette-smoking and respiratory disease, based mainly on the data compiled by these workers. The association between cigarette-smoking and cancer of the lung was confirmed. Adenocarcinoma, however, did not seem to be commoner in smokers than in non-smokers; and, although smoking seemed to increase to a comparable extent the liability of men and women to oat-cell carcinoma, it seemed much less liable to provoke squamous carcinoma in women. Assuming that the smoking habits of Lowe's controls represented those of the general population, Edwards calculated that 84% of cases of lung cancer in men and 34% of cases in women are related to smoking. If this estimate is correct, 12,000 men and 770 women died of smoker's cancer in 1954. The death-rate from lung cancer is not so high in New Zealand as in this country despite proportionately heavier smoking there [5]; but the difference may be accounted for by the greater pollution of the atmosphere in Britain, for there is evidence [6] that atmospheric pollution by itself increases the liability to lung cancer, and that the carcinogenic effects of smoking and atmospheric pollution are additive. With respect to respiratory tuberculosis, Edwards estimated that at least a third, and probably more than half, of the notifications in men over 30 years of age and almost a quarter of the notifications in women over 30 years of age were attributable to smoking.

According to Edwards's calculations concerning lung cancer and tuberculosis, the damage done per cigarette per day tends to decrease with the number smoked. Contrary to what might be expected, therefore, it seems to be less than twice as dangerous (not more than twice as dangerous) to smoke thirty cigarettes a day than to smoke fifteen a day: or, to put it in another way, there would be more lung cancer and tuberculosis in a population if all its members smoked fifteen cigarettes a day than there would be if half its members smoked thirty a day and the other half did not smoke at all.

The importance of the rôle of smoking in the ætiology of chronic bronchitis was harder to estimate, but Edwards considers that, although atmospheric pollution is probably the most important single causal agent, smoking is a necessary additional factor in most cases. In chronic bronchitis, the damage done per cigarette per day seemed to increase with the number smoked. Edwards concluded that the total number of deaths from the three major respiratory diseases in Britain—lung cancer, tuberculosis, and chronic bronchitis—would be halved in the absence of cigarette-smoking.

These calculations indicate the striking improvement in the public health that might be expected if cigarette smokers were persuaded to give up this habit—and if young people were persuaded not to engage in it.

1. Doll, R., Bradford Hill, A. *Brit. med. J.* 1952, ii, 1271.
2. Lowe, C. R. *Ibid*, 1956, ii, 1081.
3. Leese, W. L. B. *Lancet*, 1956, ii, 762.
4. Edwards, J. H. *Brit. J. prev. soc. Med.* 1957, **11**, 10.
5. Eastcott, D. F. *Lancet*, 1956, i, 37.
6. Stocks, P., Campbell, J. M. *Brit. med. J.* 1955, ii, 923.

SURGERY IN SPINAL TUBERCULOSIS

WHICHEVER part of the skeleton it attacks, tuberculosis places the surgeon in a quandary. Instinct prompts him to deal with the lesions operatively, by principles sound for other diseases—to evacuate pus where it has formed, to remove necrotic tissue, and to obliterate the defects resulting from suppuration. In the past he has been restrained, when contemplating such intervention, by two very real fears. It was always possible that by operation he might disseminate the very infection he strove to eradicate; or a secondary infection, gaining access through his incision, might produce a worse state than the initial one. Only twelve years ago, Dickson [1] justifiably warned his colleagues that even "introducing a drainage-tube into a tuberculous abscess makes certain a draining sinus will form, which will become secondarily infected and will probably never heal. It has been truly said that draining a tuberculous abscess frequently signs a patient's death warrant." At no site have these risks seemed graver than the spine. Abscesses there have nevertheless been attacked surgically. Treves, in 1884, described an operation in which diseased lumbar vertebræ were exposed by a paravertebral incision; any bony sequestra found were removed, and

1. Dickson, F. D. *In* Bancroft, F. W., Murray, G. R. Surgical Treatment of the Musculo-Skeletal System. Philadelphia, 1945.

at the same time a drainage-tube was passed through the psoas abscess, emerging some distance from the involved vertebræ. But such procedures were seldom undertaken, for too often they ended in disaster.

Today, with chemotherapy, surgery for all tuberculous lesions is permissible more often, and earlier, than has been the case hitherto. Wilkinson [2] emphasises how destructive the disease can be in young children when it affects the lower thoracic vertebræ. Conscious of the inhibiting effect of pus on bone repair, and of the inaccessibility of necrotic areas to circulating antibiotics, he has operated on such patients within a month or two of the disease being diagnosed. Foci in the vertebral bodies are curetted out and packed with bone chips, and abscesses are evacuated. With adult patients he proceeds a little more slowly, watching them for some three or four months and being prepared then to operate if bone destruction is continuing; in such cases an abscess should be suspected. The complications have been relatively trivial—short-lived sinuses and, occasionally, pleural effusions; they have not included miliary spread. In the United States the surgery of spinal tuberculosis has recently been carried a stage further. Weinberg [3] holds that permanent healing may not follow incision and drainage alone. An abscess tract may be tortuous or constricted, and may give rise to irregular diverticula which cannot be satisfactorily evacuated. He has removed the abscess sac in toto by extensive paravertebral and retroperitoneal dissection, proceeding into and beyond the femoral ring if necessary. In 11 cases thus treated there has been only 1 recurrence, and no death. But the operation is formidable.

In the management of paraplegic patients, too, surgery is coming to play a more important part. Hitherto there have been strong deterrents. First, exposure of the spinal cord by a posterior route may remove the only stable portion of a crumbling vertebral segment and may aggravate existing deformity and cord damage; and secondly the lesion itself may prove to be due to some condition—for instance, thrombosis—not amenable to surgical relief. These deterrents, plus the fact that spontaneous recovery is not rare, have in the past dictated a very conservative approach to Pott's paraplegia.

In a timely monograph Griffiths, Seddon, and Roaf [4] attack this "peculiar and quite unscientific complacency." They point out that, in the largest and most recent reported series of conservatively treated paraplegic cases, a quarter of the patients died and less than half made a worth-while recovery. They lay down a list of indications for exploration, emphasising that cases of rapid onset, severe degree, or persistent character should always be operated on. The causal focus is usually anterior to the theca, and it is now appreciated that laminectomy, and even costo-transversectomy, will not expose a lesion so situated. Griffiths et al. have found the anterolateral approach of Alexander [5] and Dott [6] to be the most useful. In this the front of the theca is approached from the side of the vertebra; three or four ribs at the affected level are resected at their posterior ends, and the appropriate transverse processes removed; the backs of the diseased vertebræ and the pedicles well anterior to the posterior joints can then be nibbled away; an excellent view of the theca is thus obtained, but the lateral stability of the spine is preserved. Perhaps the most important point which emerges from this study of Pott's paraplegia is the susceptibility of the condition found at operation to surgical treatment. The pachymeningitis and cord œdema, which loomed so large in earlier accounts, are discounted as causes of paralysis. In each of 49 cases explored, Griffiths et al. found and removed a mechanical cause of compression—sequestrum, bony ridge, or abscess—and in 36 cases a good recovery ensued. They sound a warning note when they point out that "the operation is never easy, always dangerous, and often frightening." It is obviously not one for the occasional spinal surgeon. Nevertheless we may expect to see paraplegic patients more commonly operated on and more rapidly and more commonly restored to health as a result of this encouraging report.

2. Wilkinson, M. C. *J. Bone Jt Surg.* 1955, **37B**, 382.
3. Weinberg, J. A. *Ibid*, 1957, **39A**, 17.
4. Griffiths, D. L., Seddon, H. J., Roaf, R. Pott's Paraplegia. London, 1956.
5. Alexander, G. L. *Proc. R. Soc. Med.* 1946, **39**, 730.
6. Dott, N. M. *Edinb. med. J.* 1947, **54**, 620.

CORONARY-ARTERY DISEASE

IN November, 1955, the World Health Organisation assembled a study group on atherosclerosis and ischæmic heart-disease. Their report [1] is a clear statement of established knowledge, and it also outlines ways in which this knowledge can be extended and applied.

The need to distinguish between ischæmic heart-disease and atherosclerosis is rightly emphasised: though the processes concerned in the two conditions are usually concurrent, they may be independent. Proper diagnostic criteria are important both at the bedside and in the post-mortem room, and the group propose that representative pathologists should meet and suggest uniform methods for examining the coronary arteries and for recording their results. Uniformity in standards for clinical diagnosis would be difficult to bring about; yet it is hard to see how confusion can be avoided unless there is uniformity in the use of diagnostic terms.

The factors thought to be concerned in the genesis of both ischæmic heart-disease and atherosclerosis may be divided into the constitutional and the environmental. Among the constitutional factors, the group think that heredity, sex, and specific inborn metabolic disorders (e.g., familial hypercholesterolæmia) need further study. Diet, reduced physical activity, and the stress, strain, and mental tension of modern life are three environmental factors which the group regard as important, and they discuss alcohol and tobacco, infections, and associated arterial hypertension as possible contributory agents. Their account of the principal epidemiological, laboratory, and clinical findings which implicate these factors is admirable. Their recommendations for research, on the other hand, are much less explicit and helpful; and this is a pity because vague generalisations can provide an umbrella covering much waste of time and money on unsuitable investigations.

An appendix addressed to the public-health services shows the need for epidemiological and statistical studies, particularly in areas where the inhabitants differ greatly in their economic status: for such work to be profitable, an essential is uniformity in procedures, nomenclature, and the handling and analysis of data. By way of prevention, all the public-health doctor has to offer at present is the advice of moderation. This can be directed at men and women who take too much food, too much alcohol, too many cigarettes, or not enough physical activity, or who "over-indulge in many activities." Such advice has, of course, been given by generations of wise physicians, and neglected by generations of careless patients. It is still sound, but is by no means easily put over by public-health departments, whose nurses are better at showing mothers how to raise a family than at teaching business executives how to change their manner of life. In point of fact, the techniques of this kind of health education have not yet been worked out, and the study group do not help much when they say that the "health officer can determine the type and appropriate-

1. Study Group on Atherosclerosis and Ischæmic Heart Disease. *Tech. Rep. Wld Hlth Org.* no. 117, 1957. Pp. 40. 1s. 9d. Obtainable from H.M. Stationery Office.

ness of educational activities, in collaboration with practising physicians, official and voluntary health associations, and interested community agencies." With prevention as with research, they point clearly to the broad highway but give little guidance through the lanes and byways which lead up to it. Appreciation of their excellent report is tempered only by regret that they were not kept together long enough to go into more detail.

SULPHUR AND SEBORRHŒIC DERMATITIS

THE rate and route by which substances pass through the skin from the exterior have been studied by means of radioactive isotopes. The best-known of these investigations concerned the vesicant war gases. Scott [1] has lately investigated the beneficial effect of sulphur applied locally in various dermatoses.

There is no doubt that sulphur is absorbed through the skin, since local application can lead to sulphæmoglobinæmia. It has been thought that it penetrates as a sulphide, but that its therapeutic effects follow its modification into $H_2S_8O_6$. For this reason, treatment with polythionic acids was introduced, but it does not seem to have been widely successful. Sulphur is normally present in the skin as sulphydryl and disulphide groups probably representing sulphur-containing amino-acids, particularly in the proteins of enzyme systems. It is also represented in the intercellular ground-substance as an ingredient of mucopolysaccharides. Disturbances in local sulphur metabolism may therefore have pathological consequences. A striking example is blistering from the poisoning of enzyme systems by heavy metals and its relief by offering alternative thiol groups in the form of dimercaprol (BAL).

Scott has tackled the problem using radioactive sulphur by autoradiography. She applied ^{35}S to the skin of healthy subjects and took biopsy specimens at fixed intervals. Having established the normal rate and route of absorption, she repeated these studies in cases of seborrhœic dermatitis, acne vulgaris, psoriasis, and a few other disorders.

In normal skin, absorption began two hours after application, and the element had completely crossed the epidermis within eight hours. With many substances there is preferential absorption through the pilosebaceous follicles, but this was not observed with sulphur. After sixteen hours most of the sulphur was in the dermis, little remaining in the epidermal layers. Within twenty-four hours it had disappeared, and since it did not recross the epidermis it must have been taken up systemically. There was no microscopical evidence that the sulphur was handled by the epidermal cells, its path being apparently intercellular.

In seborrhœic dermatitis, penetration began within half an hour of the application of radioactive sulphur, which accumulated in the mid-epidermis during the first twenty-two hours, none going into the basal layers or beyond. Thereafter the sulphur migrated outwards, and during its residence in the epidermis it was apparently attached to cells. In acne there was normal penetration of the epidermis, but concentration and persistence occurred in the pilosebaceous follicles from which it did not appear to be absorbed into the dermis; but the reverse is inferred from the "corresponding dermal accumulations of sulphur adjacent to the glands." In psoriasis sulphur penetrated to the basal layer within four hours, and much greater quantities were absorbed than in normal skin. Little entered the dermis and most was shed outwards through the epidermis. Again, there appeared to be intracellular localisation of ^{35}S. In the miscellaneous group, including contact dermatitis, there was little departure from normal apart from accelerated passage through the epidermis. Lichenification, however, was associated with a generally slower rate of absorption. With improvement of seborrhœic and psoriatic lesions the behaviour of sulphur reverted to normal. Scott suggests that sulphur applied to the skin in these dermatoses may have some significant biological action, such as involvement in the intracellular systems involving SS and SH groups.

We do not yet know whether the behaviour of sulphur in these cases is peculiar to that element. Would it not be reasonable to repeat the study with some element foreign to the skin? This might dispose of the suspicion that all that the tracer is doing is to reveal the dynamics of the epidermis. Two factors should be considered: first, the influence of œdema, and secondly the rate of cell division and outward migration. Œdema might favour absorption, and Scott herself observed that erythema produced with ultraviolet light caused sulphur to penetrate much more rapidly. Cell division would influence outward transference of the element; thus in lichenification, with increased cell multiplication, there is diminished absorption. Combinations of different degrees of the two factors would cause varied patterns of "absorption."

Scott's findings, if substantiated, will necessitate the recognition of seborrhœic dermatitis as a genuine entity by those who regard it as merely one manifestation of eczema, and will call for further biochemical studies of this disease.

1. Scott, A. *Brit. J. Derm.* 1957, **69**, 40.

EXTERNAL PANCREATIC FISTULA AFTER GASTRECTOMY

THE pancreas has been likened to a powder-keg which responds capriciously to handling. The dangers of operating on the pancreas, even for biopsy, are well known; and experienced surgeons are aware of the hazard of injuring this gland during subtotal gastrectomy. Millbourn [1] has shown that pancreatic damage, judged by a significant increase of urinary diastase, was present in 13 of 147 patients after gastric resection; but evidence of severe pancreatic involvement was clinically manifest in only 5, of whom 2 died. Both he and Warren [2] have discussed modifications in the technique of gastric resection to avoid such catastrophes.

When external pancreatic fistula follows operation on the stomach one of the major pancreatic ducts has usually been injured, either as it lay in the floor of a penetrating ulcer when the ulcer was being dissected off the pancreas or when the duodenal stump was mobilised. Usually these fistulæ are incomplete and close spontaneously, since in gastric resection for duodenal ulcer the duct of Santorini, being the more vulnerable, is the most commonly injured, and only rarely, as in one of Millbourn's fatal cases, does this duct exclusively drain the larger part of the pancreas.

Sinclair [3] describes an external fistula which persisted, after Polya gastrectomy for duodenal ulcer, for ten weeks, during which he studied pancreatic function. The pancreas responded poorly to intravenous secretin and pancreozymin; and, though the dosage of these hormonal extracts was small, this suggests that the function of the gland may have been impaired by duct injury at operation—a suggestion supported by the radiographic evidence of a dilated duct system and by the increase in serum or urinary enzymes found in the same circumstances in other cases. Moreover after the Polya gastrectomy the low acidity of the chyme deviated from the duodenum and passed directly into the upper jejunum may have modified the response of the pancreas to physiological stimulants such as food. Such variable factors as these may explain conflicting reports on external pancreatic fistulæ in man.

When damage of a pancreatic duct or the common bile-duct is recognised at operation the duct should be

1. Millbourn, E. *Acta chir. scand.* 1949, **98**, 1.
2. Warren, K. W. *Surgery*, 1951, **29**, 643.
3. Sinclair, I. S. R. *Brit. J. Surg.* 1956, **44**, 250.

sutured at once to the duodenum or jejunum, opposing mucosa to mucosa. (A severed duct of Santorini which can be shown to connect with the main pancreatic duct may be ligatured with safety.) When injury to a duct at operation is not detected at the time, it usually declares itself on the second postoperative day by upper-abdominal pain and pyrexia associated with raised serum or urinary amylase levels. If division of the duct of Wirsung is suspected the region of the head of the pancreas should be drained and repair of the duct deferred to a more propitious time. Otherwise the patient is treated as if he had acute pancreatitis, with continuous aspiration of the gastric remnant and intravenous administration of fluids and electrolytes; if necessary glucose and protein hydrolysates can be given intravenously; and the use of broad-spectrum antibiotics, though these do not pass into pancreatic juice, is justified at this stage. In desperate circumstances a jejunostomy to feed the patient may be life-saving, though in Sinclair's patient glucose given directly into the jejunum by tube stimulated the flow of pancreatic juice.

Should an external fistula follow, this will usually close spontaneously; and meanwhile conservative treatment is directed towards protecting the skin from digestion, maintaining fluid and electrolyte balance, and if necessary replacing lost pancreatic enzymes. It is doubtful whether measures usually recommended to depress the external pancreatic secretion, in order to encourage the fistula to close, are of much value.[4] When food is taken by mouth a bland mixed diet is probably best, since fat and protein produce less pancreatic juice than carbohydrate. Ephedrine, atropine, and propantheline ('Probanthine') have all been recommended to reduce the volume of secretion. Conservative measures should be persisted in for several months; but if the fistula has not closed after six months, or if closure leads to pain, vomiting, or cyst formation, then operation should be considered. The Lahey operation,[5] which consists in implanting the fistulous track into the jejunum, occasionally fails because the fistulous duct, having no epithelium, closes and pancreatic cysts form. In these rare circumstances some other manœuvre, such as excision of the distal part of the pancreas together with the origin of the fistula,[6 7] may be necessary. A possible alternative is a retrograde or caudal pancreatico-jejunostomy, as performed by DuVal [8] in cases of chronic relapsing pancreatitis.

CUTANEOUS URETEROSTOMY

URINARY diversion by implanting the divided ends of the ureters into the abdominal wall has never been widely favoured, for it requires a urinary collecting apparatus. On the other hand, with this method there is less risk of biochemical imbalance and ascending pyelonephritis than with ureterosigmoidostomy; and in certain cases, particularly where only one functioning kidney remains, its adoption may be advisable. Standard techniques, however, commonly involve an indwelling ureteral catheter, which may predispose to the very hazard that the method is supposed to avert—namely, stenosis of the ureteral stump and retrograde sepsis. McDonald and Heckel [9] now describe a plastic procedure by means of which long-continued catheterisation is avoided and the incidence of stricture reduced. Briefly the operation consists in splitting the end of the divided ureter and embedding each half subcutaneously into two infolded skin flaps cut from the margins of the main incision. Subsequent retraction of the skin flaps during healing maintains the patency of the ureteral orifice, and indwelling catheters can then be dispensed with. Satisfactory results are claimed in 13 cases out of 22 operated on during the past eighteen years. Although this technique does not entirely eliminate the risks and inconveniences of cutaneous ureterostomy, because of its simplicity it has much to recommend it.

CONTROLLED TRIALS NEEDED

SOME of us are concerned because the rate of the increase in true knowledge in medicine seems slow in relation to the immense amount of work done. It may be that, as science progresses, more effort must be expended to achieve a commensurate advance. But too often results are obtained whose worth is small—though much time, thought, and money has been used up—because they are based on too small a series of observations. Thus on many topics a great mass of information has been collected which cannot be integrated because the conditions under which it was collected varied so much. When a subject is being tackled for the first time, many small-scale experiments are needed to get a general idea of what is involved; but once this stage is over, large controlled experiments are often needed to test the hypotheses that have arisen. We have called for a certain return to planning in our professional affairs,[1] and more planning in experimental clinical medicine would be welcome.

An example is the treatment of high blood-pressure. Professor Pickering [2] lately contrasted our ignorance (after twenty years' experience) of how useful is sympathectomy for hypertension, with our sure knowledge of the place of drugs in tuberculosis—for there have been few controlled trials of sympathectomy. We do not certainly know whether surgery benefits hypertensives (except in very severe cases), much less which operation is most beneficial. With the hypotensive drugs, which have been the subject of so much investigation, the position is likely to be little better until a big trial is made with all the major variables controlled. No one group of physicians could expect to see enough cases to conduct such a trial: but if a large number of workers could be persuaded to treat patients in a controlled fashion as part of a prearranged plan, we might gain reliable evidence as to which drugs are indicated for which patients, and when other treatments (e.g., dietary or surgical) are needed. That such coöperative schemes can be successful is obvious from many reports of the Medical Research Council, and from such joint efforts as Anglo-American investigation of the treatment of rheumatic fever.[3]

Professor Sanjivi [4] has proposed that patients with hypertension but no symptoms should be treated with drugs in an attempt to keep the blood-pressure normal, and has given an account of some of his patients treated (without controls) with reserpine. Dr. Hambling [5] expressed the misgivings that many doctors will feel, especially in view of the side-effects of such drugs: and in our correspondence columns this week Dr. Muhammad takes the view that Professor Sanjivi's patients would have done equally well with reassurance and sedation. But the simple fact is that we do not know whether or not they would have done as well; and the only way to decide the very important question of whether or not active hypotensive treatment is worth while is to begin a controlled trial, treating some patients with drugs designed to lower the blood-pressure and others with reassurance and mild sedation. This would

4. Hellsten, H., Olsson, O. *Acta chir. scand.* 1954, **108**, 443.
5. Lahey, F. H., Lium, R. *Surg. Gynec. Obstet.* 1937, **64**, 79.
6. Cattell, R. B. *Surg. Clin. N. Amer.* 1949, **29**, 779.
7. Warren, K. W. *Ibid*, 1951, **31**, 789.
8. DuVal, M. K. *Ann. Surg.* 1954, **140**, 775.
9. McDonald, J. H., Heckel, N.J. *J. Amer. med. Ass.* 1957, **163**, 911.

1. *Lancet*, Jan. 5, 1957, p. 31.
2. Pickering, G. W. *Ibid*, p. 1.
3. *Brit. med. J.* 1955, i, 555.
4. Sanjivi, K. S. *Lancet*, Feb. 2, 1957, p. 267; *Ibid*, March 16, 1957, p. 589.
5. Hambling, J. *Ibid*, Feb. 16, 1957, p. 372.

take many years, though preliminary results would be to hand sooner. Treating a small number of patients with transient hypertension, without using controls, will tell us little.

Many other conditions call for similarly controlled study. Since living organisms contain so many variables, biological science is bound to be less exact than physical science. But one way in which the investigator of living creatures can approach exactitude is by observing a lot of them. This is not to say that large collective studies can wholly replace individual investigations: the gifted research-worker will always be needed to point the way, and the worker who studies a few patients in great detail may provide information (e.g., on individual variations and on side-effects) which would be missed in a large study designed to answer specific questions.

ANOMALOUS PULMONARY VENOUS DRAINAGE

In early fœtal life the venous drainage of the lungs is through the umbilico-vitelline system which connects with the systemic pre- and post-cardinal veins. The precardinal veins unite to form the right superior vena cava, and the postcardinal veins unite to form the inferior vena cava. At the same time the sino-atrial region of the primitive heart tube is forming a localised pouch which becomes the left atrium, and from this a channel extends towards the lungs and finally connects with them to become the common pulmonary vein. As this is dividing into the four pulmonary veins, the more primitive umbilico-vitelline system is absorbed.

Total anomalous pulmonary venous drainage in post-natal life results from the retention of the early stage of development with failure of the heart to make connection with the lungs by the common pulmonary vein. In the majority of patients the venous drainage from the lungs enters a persistent left superior vena cava by a common channel and thus connects with the right atrium. Less commonly the pulmonary veins drain directly into the right atrium or via the coronary sinus, inferior vena cava, portal vein, or a persistent ductus venosus.[1] For life to be possible there must obviously be a right-to-left shunt, and this is usually through the atrial septum by means of a patent foramen ovale or an atrial septal defect. Part of the mixed venous return to the right atrium will then pass into the left atrium, and part will go through the tricuspid valve into the right ventricle. The pulmonary and systemic venous returns are not completely mixed in the right atrium, and the pulmonary stream entering through the superior vena cava tends to be directed through the tricuspid valve into the right ventricle, whereas systemic venous blood from the inferior vena cava tends to go through the foramen ovale into the systemic arterial circulation. For this reason pulmonary arterial blood may show an oxygen saturation which is as high as or even higher than that in the systemic arterial blood.[2]

The incidence of total anomalous pulmonary venous drainage is greater than was previously appreciated; it accounts for about 2% of all congenital heart lesions.[3] Survival into adult life has been reported with increasing frequency,[3 4] but the disorder is of greatest importance in infancy because 80% of those affected die before 1 year of age.[5]

In adults the condition clinically resembles simple atrial septal defect, from which it may be indistinguishable except by radiography or cardiac catheterisation and dye-dilution studies.[2] In infants the condition may be even more difficult to diagnose. Mild cyanosis is often present in later life; but it is seldom obvious in the first six months, even though the systemic arterial blood is somewhat unsaturated. The heart is usually of normal size at birth, but enlarges rapidly in the first few months of life. A systolic murmur is often heard at the left sternal border and is thought to be due to increased blood-flow through the pulmonary artery; occasionally over the base of the heart there is a venous hum, which probably originates from the abnormal pulmonary venous return.[6] The second heart sound in the pulmonary area is split, and in about a third of cases is accentuated owing to a loud pulmonary component associated with pulmonary hypertension. Radiographically the heart often shows a characteristic "figure-of-8" or "cottage-loaf" appearance owing to persistence of the left superior vena cava with enlargement of the right atrium and right ventricle; the pulmonary artery is increased in size and activity and the peripheral vascular markings are also increased. The electrocardiogram shows evidence of right ventricular and right auricular hypertrophy.

The diagnosis is made from the high oxygen saturation in blood from the superior vena cava or high right atrium and from the unusual finding that pulmonary-arterial blood is as highly oxygenated as systemic-arterial blood.

Of 30 cases reported by Gott et al.[7] the majority died in the first three months of life and only 3 were living and past infancy. Of the 30, several had severe symptoms, and 4 were submitted to operation. Most workers believe that, if there is not severe pulmonary hypertension with pronounced reversal of blood-flow through the inter-atrial communication, surgical correction should be attempted. Operation with the aid of an extracorporeal circulation to by-pass the pulmonary circulation, or with hypothermia, has sometimes proved successful, even when undertaken in infants. The operation consists in anastomosing the common venous channel carrying the pulmonary venous return to the left atrial appendage, the atrial septal defect being left unclosed.[8] In three different series 3 out of 4 patients [1] 3 out of 6,[7] and 4 out of 12 [3] survived. Total anomalous pulmonary venous drainage must therefore take its place beside other congenital malformations of the heart and great vessels carrying a grave prognosis in early life, which may now be amenable to surgical treatment.

INTERNATIONAL FEDERATION OF SURGICAL COLLEGES

At a meeting representative of surgical colleges in many countries, held at the Royal College of Surgeons of England, with Sir Harry Platt, the president, in the chair, it was unanimously agreed to found an international federation, and the inaugural meeting is to be held at Stockholm in July, 1958. The object of the federation will be the maintenance and improvement of the standards of surgery throughout the world. The members will not be individual surgeons, but such national surgical institutions as may be elected to membership.

The bodies represented at the preliminary meeting were the Royal College of Surgeons of England, American College of Surgeons, Royal College of Surgeons of Edinburgh, Royal College of Surgeons in Ireland, Royal Faculty of Physicians and Surgeons of Glasgow, Royal Australasian College of Surgeons, Royal College of Physicians and Surgeons of Canada, Académie de Chirurgie de Paris, Belgian Surgical Society, Royal College of University Surgeons of Denmark, Dutch Association of Surgeons, Italian Society of Surgery, Norwegian Surgical Society, and Swedish Surgical Association.

1. Burroughs, J. T., Kirklin, J. W. *Proc. Mayo Clin.* 1956, **31**, 182.
2. Swan, H. J. C., Toscano-Barboza, E., Wood, E. H. *Ibid*, p. 177.
3. Mustard, W. T. *Arch. Dis. Childh.* 1957, **32**, 1.
4. Snellen, H. A., Albers, F. H. *Circulation*, 1952, **6**, 801.
5. Burchell, H. B. *Proc. Mayo Clin.* 1956, **31**, 161.
6. Du Shane, J. W. *Ibid*, p. 167.
7. Gott, V. L., Lester, R. G., Lillehei, C. W., Varco, R. L. *Circulation*, 1956, **13**, 543.
8. Mustard, W. T., Dolan, F. G. *Ann. Surg.* 1957, **145**, 379.

Before Our Time

HARVEY

THE OCULAR PHILOSOPHER*

Sir RUSSELL BRAIN

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THROUGHOUT this week we have been celebrating William Harvey, in the way in which, surely, he would most have wished to be commemorated, by describing the results at the present day of his discovery of the circulation of the blood. And what we have heard about the new work on the circulation which has been carried out even during the last twenty-five years shows that his achievement was endowed with a generative capacity for creating fresh knowledge which three centuries have not diminished, but enhanced. In making the concluding contribution to this congress, I have naturally asked myself how I could hope to say anything new upon a subject which three centuries of panegyric, including three hundred Harveian orations delivered to the Royal College of Physicians, may well have rendered threadbare. But a genius presents a fresh challenge to each generation, and it is therefore appropriate that for a few minutes we should look at Harvey's thought in the light of today.

* * *

Harvey, though a man of all time, was also, inevitably, a man of his own time, and it is one of the values of medical history that it enables us to see the great originators against the background of the ideas which they took for granted, and so to understand better both the greatness and the limitations of their achievements. Harvey's ideas were necessarily expressed in the language of his own day, which presents us with a difficulty of interpretation. His thought was sometimes so far ahead of his time that the current terminology was inadequate for it. Sometimes, therefore, the words he uses mean more than they meant then, and other than they mean now.

This point is well illustrated by his change of view between the *De Motu* and the *De Generatione* on the relative importance of the heart and the blood, and his final emphasis upon the blood in the *De Generatione*. "I maintain," he says there, "against Aristotle, that the blood is the prime part that is engendered, and the heart the mere organ destined for its circulation. . . . It clearly appears that the blood is the generative part, the fountain of life, the first to live, the last to die, and the primary seat of the soul; the element in which, as in a fountain head, the heat first and most abounds and flourishes; from whose influxive heat all the other parts of the body are cherished, and obtain their life." In the penultimate chapter of the *De Generatione* Harvey deals with the innate "heat." Here he is striving to turn the terminology of outworn ideas into scientific concepts. The heat, he says, is the spirit or spirits, and both are nothing other than the blood. And according to Harvey "the blood is the first produced and the most principal part of the body, endowed with each and all of these virtues, possessed of powers of action beyond all the rest, and therefore in virtue of its pre-eminence meriting the title of spirit." He then goes on to reject the suggestion that the blood must contain other spirits of an aerial or ethereal nature, on the ground that being composed of elements it could have no power of action beyond these elements or the bodies compounded of them. "Nor can it be admitted that there are any other bodies or qualities of a spiritual or incorporeal nature, or any more divine kinds of heat." Harvey is careful to define the word "spirit" as he uses it. It means what Hippocrates called *impetum faciens*, or moving power: implying by this "whatever attempts aught by its own proper effort, and causes motion with rapidity and force, or induces action of any kind." Thus "spirit" might be in part translated "function," in part "stimulus." Here, then, if we penetrate beyond Harvey's words to his thought, we find him making, as best he could in the terminology of his day, the revolutionary statement that the blood is of supreme importance because it carries out a whole range of as yet dimly discerned vital functions (spirits) solely by means of its physical constituents (elements).

Similarly it is easy to miss the fact that even when Harvey's thought was apparently dependent upon archaic ideas he often used them in a new and more profound sense. A number of writers have pointed out that he was influenced by two ideas which he derived from Aristotle—the special virtue of circular motion and the belief that the living organism, the microcosm, embodies the same principles as the universe, the macrocosm. Both of these ideas are illustrated in a famous passage in the *De Motu*:

> "We have as much right to call this movement of the blood circular as Aristotle had to say that the air and the rain emulate the circular movement of the heavenly bodies. The moist earth, he wrote, is warmed by the sun and gives off vapours which condense as they are carried aloft and in their condensed form fall again as rain and remoisten the earth, so producing successions of fresh life from it. In similar fashion the circular movement of the sun, that is to say its approach and recession, give rise to storms and atmospheric phenomena."

The same comparison reappears in the *De Generatione*, when, again with a reference to Aristotle, the rhythm of life from the egg to the fowl and back again to the egg is described as a circuit and compared to the principle active in the universe which is responsible for the rising and setting of the sun.

> "And this is the round which makes the race of the common fowl eternal; now pullet, now egg, the series is continued in perpetuity; from frail and perishing individuals an immortal species is engendered." And, in a phrase with which Thomas Browne might have been pleased, "the egg, I say, is a period of this eternity."

* * *

These ideas of Harvey have been used to illustrate the importance of analogy in scientific thought. To a superficial view today it may seem that there is no connection between the circular motion of the sun in the heavens, or of moisture in the atmosphere, and that of the blood in the body. Harvey, it might be argued, arrived at the right idea by means of a false analogy. His contemporaries, whether or not they accepted his discovery, would have found nothing unreasonable in his use of such analogies; it was a method inherent in the contemporary climate of thought. And we, looking back on Harvey from the vantage-point of three centuries, may perhaps pause for a moment to wonder what our successors three centuries hence will think of some of the ideas we take for granted, and indeed justify pragmatically by their scientific results.

But it would be a mistake to dismiss, as merely an analogy, Harvey's interpretation of the idea that the microcosm mirrors the macrocosm, that the organism is a model of the universe. This was a much more profound conception than the similar contemporary hypotheses of alchemy. We see this in a striking passage in the *De Generatione*:

> "But nature, the principle of motion and rest in all things in which it inheres, and the vegetative soul, the prime efficient cause of all generation, move by no acquired faculty which

* Final paper read at the Harvey Tercentenary Congress on June 7, 1957.

might be designated by the title of skill and foresight, as in our undertakings; but operate in conformity with determinate laws like fate or special commandments—in the same way and manner as light things rise and heavy things descend. The vegetative faculty of parents, to wit, engenders in the same way . . . as the spider weaves her web, as birds build nests, incubate their eggs, and cherish their young, or as bees and ants construct dwellings, and lay up stores for their wants; all of which is done naturally and from a connate genius or disposition; by no means from forecast, instruction, or reason."

Here we see the full range of Harvey's mind as a scientific philosopher. Beginning with "nature, the principle of motion and rest in all things" he links together gravitation, the fertilisation and development of the ovum, and the instinctive behaviour of insects and birds, as operations "in conformity with determinate laws like fate." Hence the organism mirrors the universe, not in virtue of some occult principle of similarity, but because the universe and its minutest parts are subject to identical laws.

When Harvey seeks to explain how these laws apply to the development of the individual from the fertilised ovum his explanation has been described as vitalistic. What puzzled him was how so complex a structure as the fully-developed chick could construct itself out of the homogeneous material which composed the original egg. When Harvey contrasts metamorphosis and epigenesis as modes of development of the organism we see his scientific philosophy at its best. With no knowledge of chromosomes or genes, of chemical organisers or gradients, with nothing on which to build but the unaided observations of his own eyes, he could do no more than reach a statement of the problem, but the strength of his position lies in the fact that he rejected explanatory hypotheses for which there was no evidence. His description of the development of the chick, therefore, is one which, however inadequate it was bound to be, needs only to be filled in with subsequent scientific discoveries, as the following passage shows:

"Now it appears clear from my history, that the generation of the chick from the egg is the result of epigenesis, rather than of metamorphosis, and that all its parts are not fashioned simultaneously, but emerge in their due succession and order; it appears, too, that its form proceeds simultaneously with its growth, and its growth with its form; also that the generation of some parts supervenes on others previously existing, from which they become distinct; lastly, that its origin, growth, and consummation are brought about by the method of nutrition; and that at length the foetus is thus produced. For the formative faculty of the chick rather acquires and prepares its own material for itself than only finds it when prepared, and the chick seems to be formed and to receive its growth from no other than itself."

Thus, having reached the limit of the knowledge which was possible to a combination of naked-eye observation and reflection, Harvey had to explain what he could not understand in terms of what he called "the soul or a faculty of the soul."

It may be said that if this is vitalism, vitalism is merely another name for our ignorance, and some no doubt would maintain that that is all it ever is. But in a broader philosophical sense Harvey was a vitalist, or at any rate, an antimaterialist.

"They who . . . assign a material cause, and deduce the causes of things either from the elements concurring spontaneously or accidentally, or from atoms variously arranged . . . do not attain to that which is first in the operations of nature . . . They do not recognise that efficient cause and divinity of nature which works at all times with consummate art, and providence, and wisdom, and ever for a certain purpose and to some good end."

I wonder what Harvey would have said if he could have been shown all that the scientist of today knows of embryology. Growth, form, and nutrition were the key-words to him and they are the key-words still. How delighted he would have been at the vast array of knowledge which has come to fill those empty spaces he had no means of filling! And yet I wonder if his restless mind would have been satisfied. Would he have looked beyond the mere descriptions of events to a still elusive *anima*, a principle of form, which we still lack, perhaps because it belongs to a scientific category yet to be discovered?

* * *

We speak of Harvey, the observer and thinker, but there are many types of observer and many kinds of thinker. The key to Harvey's thought is surely provided by Aubrey's famous statement that he "did delight to be in the darke, and told me he could then best contemplate." Harvey was a contemplative, and a visionary, whose delight came from reflecting upon the world of Nature, and whose vision found its inexhaustible satisfaction in living things. In Thomas Browne's magnificently apt description he was "that ocular Philosopher and singular discloser of truth." It will not perhaps derogate from Harvey's uniqueness to compare him with another unique "ocular Philosopher," Sherrington, the centenary of whose birth we commemorate this year. Is it altogether inappropriate to compare *The Integrative Action* with the *De Motu*? And though Sherrington's later work *Man on his Nature*, was written with a different intention from Harvey's *De Generatione*, the same spirit shines through both—an almost mystical delight in life seen with the eye of scientific understanding. Sherrington was a poet, Harvey, as far as I know, wrote no poetry, but who that has read *De Generatione* can doubt that he had a poet's delight in words. All this is to be found in that statement of faith which is so characteristic of him, a cry from a heart, indifferent perhaps to the precise formulas of reason in such high matters, but uttering its reasons which the reason cannot know.

"Wherefore, according to my opinion, he takes the right and pious view of the matter who derives all generation from the same eternal and omnipotent Will, on whose nod the universe itself depends. Nor do I think that we are greatly to dispute about the name by which this first agent is to be called or worshipped; whether it be God, Nature, or the Soul of the Universe,—whatever the name employed,—all still intend by it that which is the beginning and the end of all things; which exists from eternity and is almighty; which is author and creator, and, by means of changing generations, the preserver and perpetuator of the fleeting things of mortal life; which is omnipresent, not less in the single and several operations of natural things, than in the infinite universe; which, by his will or providence, his art and mind divine, engenders all things."

"Finally, I wonder if we in the public dental service are not as much to blame as anyone for the present lowly position of children's dentistry in the eyes of the public. Is it possible that if we had said regular six-monthly examination and advice only for such a number of children as we dental officers can treat properly in the course of a twelvemonth, we should have been able to produce at least a proportion of dentally fit school-leavers? Is it possible that the butter has been spread so very, very thinly that dentally speaking we have failed in our task? Is it possible that the greatest good for the greatest number resulted in dental evil for the bulk of children? The real test of the success of a dental health service lies not in a statistical appreciation in terms of millions of conservations. Intelligent treatment planning based on a policy of a reasonable number of children per operator and on a proper understanding of the growth of the jaws and teeth-supporting structures, in the light of end results, designed, not necessarily for perfection but in the light of reason, would in the long run produce a high proportion of healthy, functional mouths."—W. G. SENIOR, F.D.S. R.C.S., *Publ. Hlth*, June, 1957, p. 92.

Conferences

HARVEY TERCENTENARY

DELEGATES from both hemispheres met in London last week for a congress to mark the end of the third century since William Harvey's death. It had been organised by the Harveian Society of London and a committee representing the Royal Society, the Royal College of Physicians, the Medical Research Council, and other bodies concerned with the study of the circulation. Opening the scientific programme at the Royal College of Surgeons on June 3, Mr. A. DICKSON WRIGHT, the president, read a message of greeting from the Queen.

Growth of Knowledge

The PRESIDENT, introducing the first session, in which the beginnings of medical science were traced from Tudor times, said that three hundred years before, almost to the hour, the clouds had descended over the conscious life of William Harvey as on that summer day the circulation of blood faltered within the brain of its discoverer, and he passed from coma into death. The President recalled the last years of Cromwell's rule, when Harvey, still a Royalist and friend of Charles II, no doubt hoped for the Restoration. Born in the reign of Queen Elizabeth I, he lived for several years in London at the same time as William Shakespeare, who died in 1616—the year in which Harvey as Lumleian lecturer in the Royal College of Physicians first spoke of his work on the circulation.

Prof. K. J. FRANKLIN, F.R.S., representing the Royal Society and Harvey's own hospital, St. Bartholomew's, and himself the author of the most recent translation of *De Motu Cordis*, spoke of the origins of the great work in the earlier career of its author, and of its still earlier roots in the notable anatomical studies of his teacher Fabricius of Padua, who in his own work *de Venarum Ostiolis* in 1574 had shown that valves are a feature of all the veins of the body. It was probably in the darkened anatomy theatre at Padua, while watching a demonstration in the well-lit arena below, that the purpose of the valves began to suggest itself to Harvey. Fabricius was by then an old man, but he carried on a fine tradition, begun by Vesalius and Fallopius, of study based on factual observation rather than accepted dogma. The Galenic concept of the blood-flow was of some slow, small drift of blood from the right to the left heart, with no inkling of the true circulation or of the speed and volume which it possessed. Robert Boyle had recollected Harvey saying that the valves, everywhere placed so that they can give free passage of the blood to the heart, must imply some other way for the blood to reach the outer limits of the veins and that the arteries must be there for this purpose. It was not known exactly when Harvey returned to England, but it was in the opening years of the 17th century that he became attached to St. Bartholomew's, and he lived at Ludgate near old St. Paul's. He soon became a fellow of the Royal College of Physicians, then a censor, and in 1615 a Lumleian lecturer—the appointment which led to the release of his researches. Passages from the lecture of 1616 showed that the essence of the work was complete though it was not actually published until 1624.

Prof. JOHN FULTON (Yale) carried on the story of the circulation to the time, years after Harvey's death, when the hitherto undetected part of the circulation—the capillaries—were studied microscopically by Malpighi, Leeuwenhoek, Hales, and others. They had, as Sherrington once put it, the capacity to put questions to Nature to which she could reply; and Malpighi, studying the lungs of frogs with the aid of a crystal and candle, might have said, with Homer, "I see with mine own eyes a work, trusty and great."

Sir CHARLES DODDS, F.R.S., examined the effect of Harvey's discoveries on his fate as a practising physician. Modern scientific medicine began with Harvey, but paradoxically his own system of medicine was little affected. Things were better now, but the possible conflict between scientific idealism and the conditions of practice could still afford a problem.

Dr. F. A. WILLIUS (Mayo Clinic) was unable to attend, but his paper, on historical aspects of the knowledge of congenital heart-disease, was ably presented by Dr. T. COTTON (McGill). Harvey himself wrote that in the embryo, while the lungs were yet at rest, the two ventricles acted as one. There were many early observations on the post-mortem findings in cases of congenital heart-disease. Full understanding of the structural implications of cyanotic heart-disease was not reached until the description by Fallot in 1888 of *la maladie bleue*, but Rokitansky had in 1875 noted that septal defects appeared to be due to failure of rotation of the developing heart.

Rôle of the Heart in the Circulation

At the next session attention swung sharply to the present. Prof. G. W. PICKERING, the chairman, quoted delicately from Harvey, first on the clear body of the little shrimp, with its heart-beat visible within, and the watching of a chick embryo, like a small cloud, its heart a mere point of blood, beating and disappearing. Harvey felt that there had to be a circulation of the blood, or the veins would empty and the arteries burst. Furthermore if the volume of the ventricle, in the open and closed state, were considered, at every beat an ounce or two of blood would be passed on; in half an hour 1000 beats or more would carry forward a greater quantity of blood than is found in the whole body.

Dr. L. N. KATZ (Chicago) observed that the control of the circulation was adjusted to its low thrust part, and could be considered under two headings: neurohumoral and intrinsic. The intrinsic quantitative factors were the end diastolic pressure and the after-load or work when contraction begins. He and his team had produced a special heart-lung preparation in which the right heart was replaced by a pump and the isolated coronary venous return could therefore be collected. Flow and oxygen consumption across the coronary circulation was measured and related to other variables. Only a rough correlation could be made between oxygen consumption and the aortic pressure, but a steady relation existed between coronary flow and myocardial oxygen consumption. At a fixed work level they could both be made to increase, but when the work load was changed, as in stress adaptation, the oxygen consumption actually lessened in relation to the increased coronary flow: the heart appeared to change gear, and thus to gain a second wind. Under hypoxia conditions the percentage oxygen extraction increased with the oxygen lack: the coronary flow increased. Efficiency was not the only aim of the heart mechanism: protection was no less important.

Prof. K. MATTHES (Heidelberg) recalled that in the fœtus and newborn child there was not much structural or physiological difference between the two ventricles, but that soon the heavier and more variable load on the left heart resulted in changes of hypertrophy rather than actual growth in relation to the right. In the adult the left ventricle could be considered almost as a cylinder in shape and action from the disposition of its fibres, while the softer right ventricle conformed more to the spiral shape of the heart itself. Functionally, the left heart showed a greater blood-flow per unit mass of muscle, and the coronary blood-flow was also greater, as was the vulnerability to hypoxia; it was less distensible than the right, having a different modulus. The job of the right ventricle was to maintain, as Gowers showed, the very constant volume of filling of the left auricle. In this it was not the servant of the peripheral circulation; it

could change its action quite independently of this. In general it was affected by rather slow-acting factors—even those of renal function and extracellular-fluid exchanges—but the left ventricle was attuned to more rapid influences, acting in the coronary supply, and was more sensitive because of its fibre structure and load factors. Ligation produced a larger zone of infarction in the left coronary supply than the right.

Dr. S. WEIDMANN (Berne) had been able, with the help of a tiny glass capillary, to insert an electrode into the actual fibres of the turtle heart and thereby to conduct direct electrocardiography in relation to other changes. He showed the differing behaviour of the potentials in contracting auricle, bundle, and nodal material, and also measured the outflow of radio-potassium in the sinus venosus: it tallied closely with the phases of contraction. The polarisation effects of the cycle were thus confirmed in relation to the electrical and mechanical changes; the latter he whimsically described as a "nuisance," for they tended to jerk his electrodes out. The effect of calcium, he showed, is an intermediate one; while it magnifies the mechanical change it does nothing to the electrical potentials.

Dr. PAUL WOOD showed a colour film mainly concerned with the jugular venous pulse. He recalled Mackenzie's observations and the tracings of Sir Thomas Lewis's polygraph. The film showed the pattern of the neck vein movement in health and disease; characteristic formations were shown in patients with tricuspid disease, pure pulmonary stenosis, constrictive pericardium, and endocardial fibrosis.

Hæmodynamics and the Coronary Circulation

Prof. C. HEYMANS (Ghent) outlined the history of our knowledge of the control of blood-pressure and heart-rate by the baroreceptors of the carotid sinus and the aortic arch, from Astley Cooper's first observation of the pressor and accelerator effect of carotid compression to his own work in progress today. The mechanism can be reset, he said, to function at other levels of pressure, and he gave new details of the depressor action of noradrenaline applied to the artery wall in the receptor zone.

Prof. GUSTAV NYLIN (Stockholm), like Harvey, was concerned with the measurement of stroke and minute volume. He described his experiences of angiocardiographic assay and of dilution techniques. He had tried to find the volume of blood in the chest and its separate organs, but the calculations were difficult and uncertain.

The changes in the circulation at birth, said Dr. G. S. DAWES (Oxford), have received little attention in the past three hundred years. Indeed Harvey appreciated the main facts. Modern work on sheep and goats attached by the cord to the intact placenta had shown the distribution of the blood with regard to oxygen tension: although the ventricles worked in parallel there were inequalities, the head getting more oxygen than the lower extremities. Just before birth the fœtus was on the verge of oxygen lack. The closure of the ductus, he has found, is delayed a week or more: this may be an advantage in anoxic conditions occurring then; and indeed he has found that the diameter is a function of the oxygen tension, and so are the murmur and thrill.

Coronary Circulation and Control

Dr. CLAUDE S. BECK (Cleveland) showed how the distribution of the blood in the coronary arteries might be more important than its amount. His striking film of the operation which he has developed [1] was an impressive testimony to the care and patience of his work in this field. He felt that the small intercoronary anastomoses formed allow enough blood to reach the right place to prevent the trigger effect of acute local ischæmia in producing lethal ventricular arrhythmia.

1. See *Lancet*, May 18, 1957, p. 1025.

Pulmonary Circulation

Dr. ANDRE COURNAND (New York) described methods of measuring the pulmonary circulation. It is not yet certain, he said, where the increase arises in pulmonary hypertension, but he inclined to the view that it might be a local effect of the blood itself in the vessels as in hypoxia; he had found that when one lung was supplied with 6% or less oxygen in nitrogen, though there was not as a rule any change in pressure, the blood-flow fell on the affected side after 10 minutes. Acetylcholine, which normally did not affect the pressure, caused a profound fall under hypoxic conditions, though the systemic blood-pressure was unaffected. He had shown that these effects were independent of the sympathetic nervous system.

Prof. C. V. HARRISON had studied the structural changes accompanying pulmonary hypertension in mitral and congenital heart-disease. The most constant change was narrowing of the segmental arteries of the lower zone of the lung, usually diffuse and due to muscular hypertrophy, but sometimes localised and of atheromatous appearance.

Cardiac Surgery

A session was devoted to the results of cardiac surgery, with Sir CLEMENT PRICE-THOMAS in the chair. Several surgeons outlined their present experiences, and at the end another team spoke by wireless from New York. The growing-point in heart surgery at present is clearly operation on the open heart, made possible by hypothermia. Most speakers felt that the extracorporeal machines were here to stay. As Sir RUSSELL BROCK said, in a masterly account of his experience of the correction of pulmonary stenosis, we must consider the opportunity to improve on the simple, indirect, and often incomplete remedies with which such good results have been gained. For each of the subtypes he described the method which he had found suitable in the past.

Earlier Dr. MAURICE CAMPBELL had spoken on coarctation of the aorta. The danger time was the third decade; after this the case for operation was not quite so strong. He showed the impressive grouped blood-pressure figures in the Guy's series, and gave the reassurance that patients maintained the figure obtained at their first outpatient visit after operation for five years and more. With regard to pulmonary stenosis he felt there was still a place for the anastomotic operations with their good results and lower mortality.

Cerebral Circulation

Dr. SEYMOUR S. KETY (Bethesda) described work at the National Institutes of Health on the factors thought to affect cerebral circulation. It had been found that mostly intrinsic mechanisms of humoral type were involved, carbon-dioxide tension in particular: the flow fell with hyperventilation and rose with inhalation of carbon dioxide. The blood-pressure determined the rate of flow only when this was quite low, and then it was the limiting factor. Sympathetic denervation, sleep, alcohol in normal doses, and even hypertension did not change the normal value, which was about 50 ml. per 100 ml. brain per minute. Arteriosclerotic cerebral disease reduced it particularly in psychotic cases. Papaverine, as in the pulmonary circuit, relaxed vasomotor control and gave up to 25% increase.

Prof. TH. ALAJOUANINE (Paris) had studied the normal and morbid appearances of the cerebral vessels by angiography in both the dead and the living. He recognised that transient hemi-phenomena resulted from partial occlusion of any of the big cerebral arteries. The intracerebral vessels, he showed, have a great deal of collateral overlap.

Dr. E. H. BOTTERELL (Toronto) spoke on his experience of surgery in the treatment of cerebral aneurysm. He

felt that the limitations of neck ligation operations were severe, particularly in the poor-risk patient. The present tendency was to use the protection afforded by hypothermia to cover the risks of an intracranial attack. He emphasised the danger of unrecognised mechanical complications of the hæmorrhage: hydrocephalus, a large lateral clot resembling a middle meningeal compression in its behaviour, arterial spasm, and, of course, recurrent bleeding. He showed some impressive cases of arteriovenous malformation and their cure, and of traumatic arteriovenous fistula in which the patient was becoming semisyncopal from the shunting back of his carotid blood. As in the limbs, proximal ligation in such a case would often make things much worse because the remaining blood beyond the fistula rushed back into the vein. Distal ligation or clipping must therefore be added.

Splanchnic Circulation

Sir JAMES LEARMONTH suggested that the time was ripe for the introduction of a unit of blood-flow, and that we should follow the physicists and make it an eponym: he felt that we should think in terms of one or more "Harveys."

Dr. SHEILA SHERLOCK showed that, however the portal pressure had been measured in the past, there was fair agreement on normal and pathological values. She noted that the degree of collateral-vein formation was not necessarily an indication of the severity of the portal hypertension—for example, in some very acute cases there had not been time for them to form and in others the very profusion of them might be the means of keeping the pressure down. Indeed the spleen might shrink again and even the patent portal vein might not show on a further phlebogram. There could be a reversal of the flow.

Prof. R. MILNES WALKER (Bristol) spoke mainly on the pathology of portal hypertension. In the healthy if the portal vein was compressed the pressure beyond rose from 10 to 40 mm. Hg. This was the level encountered in patients who bled, but, as Dr. Sherlock had said, some with very large veins might not have so high a pressure. This did not prevent them from bleeding, however. Also, children with extrahepatic block had a normal liver and no ascites. Their liver was fed only by arterial blood and was often very red in consequence. Portal blood was therefore not essential to the liver. Ascites, though not an indication for portacaval shunting, was not a contra-indication; indeed, since it was likely to be aggravated by portal hypertension, it would sometimes respond favourably to the shunt in cases meriting the operation because of bleeding. Like Dr. Sherlock he felt that the spleen should shrink, and had not seen much evidence of any continued hypersplenism once a good shunt had been provided. Fibrosis of the liver had little to do with the degree of hypertension, but the regeneration nodules had been blamed. He drew an important distinction between pre-sinusoidal obstruction, in which the outlook with a shunt was very good, and the various other forms in which post-sinusoidal lesions were present—for example, the Budd-Chiari condition and veno-occlusive disease seen in Jamaica, and in centrilobular necrosis after healing. In each of these ascites and rapid liver failure tended to develop, and the patients were not helped by a shunt. Some damage might be secondary to vascular insufficiency, and mixed types did occur. The fact remained, however, that in severe bleeding forms of the disease only a wide direct end-to-side portacaval anastomosis could stop the decline of the patient.

Peripheral Circulation

Prof. HENRY BARCROFT, F.R.S., took the delegates on an imaginary tour of the several laboratories where the normal peripheral circulation is being investigated, and modestly gave credit to everyone but himself for the advances he described. The release of vasomotor tone on body-heating had now been shown to be wholly cutaneous; the forearm, physiologically "skinned" by adrenaline ontophoresis, showed no response when only the muscle-flow was being measured. Edholm had recently shown that ring block with local anæsthetic abolished the forearm response to heating; this was strong evidence for the existence of vasodilator fibres, and Greenfield had produced evidence that these were cholinergic.

Prof. W. D. M. PATON, F.R.S., discussed the pharmacological action of ganglion-blocking drugs. Some practical points emerged concerning the danger of a fall in blood-pressure in preventing the clearance of relaxants and other drugs. He felt that autonomic overactivity might be a serious liability in injury or prolonged operation and that blockade by spinal or splanchnic anæsthesia might protect against shock and hæmorrhage.

Prof. J. H. DIBLE distinguished clearly between ischæmia of central or large-vessel origin and the much rarer form in which the distal, small vessels are thrombosed. With regard to Duguid's revival of the Rokitansky theory of atheroma, there was, he felt, evidence that thrombus could change in this way, but that mural abnormalities could develop at the same time.

In discussing treatment, Prof. C. G. ROB emphasised that arterial disease is always generalised, and that only when the local features predominate to a disabling extent should surgery be undertaken. Of several hundred patients with aortic, iliac, or femoral arterial occlusion only a minority were suitable for operation, and this was particularly true of the femoral type. The development of gangrene might lead to a decision to operate, and when arterial reconstruction had been done for this reason the majority of patients had done well. Professor Rob ended by reviewing 26 cases of occlusion of the internal carotid artery. Where the lesion was localised to the first $^1/_2$ inch or so and obstruction was incomplete, reconstruction had always abolished the symptoms.

Other Events

Sir RUSSELL BRAIN'S concluding address to the congress in London appears on p. 1235 of this issue.

On Saturday a historical session was held in Folkestone under the chairmanship of Sir GEOFFREY KEYNES.

TRICHOMONAS INFECTIONS

AN international symposium on trichomonas infections, organised by the Société Française de Gynécologie, was held at Rheims on May 28–30.

It was concluded that the apparent increase in the incidence of such infections is probably due to increased awareness and improved diagnosis of the condition. In infected women the urethra is usually involved; but other extension beyond the vagina is exceptional. Acute trichomonas vaginitis may cause dyspareunia which persists as a psychological condition after the infection has been cured. In men infection is much commoner than is generally supposed, and it may extend beyond the urethra to the prostate and seminal vesicles.

A commission was appointed to examine the question: Is trichomoniasis a venereal disease? The commission reported that this infection should not be designated as a venereal disease; but its transmission is usually coital, and, as far as public-health administration is concerned, it should be regarded as a venereal disease.

Wherever possible, both partners should be treated in order to prevent reinfection.

In a session on pathology, it was concluded that there was no evidence of the existence of any sort of cystic or other resistant form of the organism, and it was emphasised that intestinal trichomonads cannot infect the vagina.

The final session was devoted to treatment. It was agreed that there is still no satisfactory remedy; many agents appear to be promising in vitro, but in practice there remains the problem of bringing the remedy into contact with the parasite. A. B. Kupferberg (U.S.A.) declared that in clinical trials nothing less than complete parasitological cure should be accepted as a criterion of cure. Asymptomatic cases should be treated.

Special Articles

THE INCIDENCE OF INFECTION FOLLOWING GYNÆCOLOGICAL OPERATIONS

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POSTOPERATIVE wound infection is still a major problem. Colebrook (1955) wrote: "There is still much more infection transmitted in our operating-theatres and wards than we should accept." Recent reports suggest that sepsis is actually increasing. Strahan (1951) reported an incidence of 4·3% following elective operations for hernia. Howe (1954) reported that 7·2% of clean surgical cases became infected. Blowers et al. (1955) noted a gradual increase in postoperative infection in a thoracic unit, which was closed and reorganised after the infection-rate had risen to 10·9%.

After certain changes in the ward and operating-theatre for gynæcological patients at the City General Hospital, Sheffield, the postoperative infection of wounds appeared to be reduced. This improvement, however, was not maintained, and a more detailed investigation of the infection-rates before and after these changes was made. The results are reported here.

Before July, 1952, two gynæcological units (unit A and unit B) were housed in a single ward, where there were often as many as 42 beds occupied at one time; and all the operations were performed in the general operating-theatres of the hospital, which were often in use continuously day and night. After July, 1952, unit A moved into a newly equipped 18-bed ward, and unit B remained where it was, its beds, however, being reduced to 24. Two labour wards, which had been converted into a small gynæcological operating-theatre, were opened for the use of both Units.

TABLE I—ADMISSIONS AND ABORTIONS

Period	Unit	No. of beds	No. of admissions	No. of abortions
I	A and B	42	1317	507
II	A	18	580	224
	B	24	771	345
III	A	18	554	205
	B	24	709	330

TABLE II—DISTRIBUTION OF 651 CASES ACCORDING TO PERIOD AND TYPE OF OPERATION

Period	Group 1 (total hysterec-tomy)	Group 2 (abdominal operations)	Group 3 (pelvic-floor repair, &c.)	Group 4 (vaginal operations)	Total
I	63	54	53	23	193
II	75	47	73	43	238
III	68	57	68	27	220
Total	206	158	194	93	651

Material

Three one-year periods were chosen for study. The first period was the year before the above-mentioned changes (from July 1, 1951, to June 30, 1952); the second (from July 1, 1952, to June 30, 1953) and the third (from July 1, 1953, to June 30, 1954) covered the two years after the changes.

The total gynæcological admissions in the periods under review are given in table I, which shows little difference between the two units as regards the total admissions and the number of abortions.

651 cases are reviewed, comprising 193 in period I, 238 in period II, and 220 in period III.

Only major gynæcological procedures were studied, as being more likely to provide useful data than the minor procedures and abortions. The 651 cases were grouped according to the type of operation (table II) as follows: (1) abdominal total hysterectomy; (2) gynæcological abdominal operations other than total hysterectomy; (3) pelvic-floor repair and other vaginal operations in which the peritoneal cavity was not opened; and (4) vaginal operations in which the peritoneal cavity was opened—e.g., vaginal hysterectomy, and prolapse with pouch-of-Douglas hernia.

All cases showing evidence of preoperative infection were excluded from the study. The age-distribution of the patients operated on in each unit was similar in all the groups. We recognise that comparisons between the results in the two units and even between the three different periods need to be made with caution because of sources of bias, known and unknown. For instance, the two wards were not at all alike in design; in one unit for some time the skin-temperature was recorded instead of the oral temperature; the proportion of very serious cases dealt with varied with the units and with the periods; the standard of the case documentation varied; and the quality of nursing was not uniform throughout.

TABLE III—INCIDENCE OF INFECTION (ALL OPERATIONS)

Period	No. of patients	No. of infections	
		All cases	With chest and urinary infections excluded
I	193	81 (*42%*)	51 (*26%*)
II	238	116 (*48%*)	57 (*24%*)
III	220	115 (*52%*)	76 (*35%*)
Total	651	312 (*48%*)	184 (*28%*)

Criteria of Postoperative Infection

A case was considered to be infected after operation if it showed any one of the following: pyrexia (100·4°F or more at any time or 99°F on three or more post-operative days); chemotherapy for an infective condition; wound sepsis; secondary hæmorrhage; paralytic ileus; thrombophlebitis.

Cases were counted only once, even if several criteria of infection were present simultaneously. In the preparation of tables III, IV, and V a case with a chest or urinary infection was not omitted unless this was the only infection present.

Results

All Patients

When all the patients were considered together, the infection-rate was found to have risen in period II and again in period III (table III). The overall incidence of infection at 48% was high, but it fell to 28% when urinary infections (which were very numerous) and chest infections (which were very few) were excluded.

Table III also shows that, after excluding urinary and chest infections, there appears to be a reduction in the incidence of infection in period II. The reason for this is not clear (see below).

By Units

The incidence of infection in the two units was studied separately (table IV). When all infections are considered, it is seen that the high incidence of infection and the deterioration with succeeding periods were common to both units. The results in unit B were affected much more than those in unit A by the exclusion of chest and urinary infections. Patients in unit B ran a particular risk of urinary infection (see below).

TABLE IV—INCIDENCE OF INFECTION (ALL OPERATIONS) BY UNITS

Period	Unit A			Unit B		
	No. of patients	No. of infections		No. of patients	No. of infections	
		All cases	With chest and urinary infections excluded		All cases	With chest and urinary infections excluded
I	85	33 (39%)	24 (28%)	108	48 (44%)	27 (25%)
II	126	57 (45%)	43 (34%)	112	59 (53%)	14 (13%)
III	124	63 (51%)	53 (43%)	96	52 (54%)	23 (24%)
Total	335	153 (46%)	121 (36%)	316	159 (50%)	64 (20%)

Abdominal operations (groups 1 and 2).—The incidence of infection in each unit was determined for abdominal operations only (table V). This revealed that unit B experienced a significant reduction in the amount of postoperative sepsis in period II, and that the amount of infection was less than in unit A in periods II and III.

Vaginal operations (groups 3 and 4).—The incidence of infection in each unit after all vaginal operations was determined (table VI). This revealed that the postoperative infection-rate in unit B was almost twice that of unit A; but this was almost wholly accounted for by urinary infections, and, when these were excluded, unit B appeared to fare very much better than unit A.

Frank sepsis.—Lastly, it was decided to get some idea of how much of the sepsis recorded amounted to frank abdominal or vaginal suppuration. The data for all infected abdominal cases for unit A were therefore re-examined (table VII), from which it seemed that just

TABLE V—INCIDENCE OF INFECTION (ALL ABDOMINAL OPERATIONS) BY UNITS

Period	Unit A			Unit B		
	No. of patients	No. of infections		No. of patients	No. of infections	
		All cases	With chest and urinary infections excluded		All cases	With chest and urinary infections excluded
I	44	18 (41%)	13 (30%)	73	26 (36%)	23 (32%)
II	56	22 (39%)	16 (29%)	66	16 (24%)	12 (18%)
III	62	33 (53%)	28 (45%)	63	24 (38%)	19 (30%)
Total	162	73 (45%)	57 (35%)	202	66 (33%)	54 (27%)

TABLE VI—INCIDENCE OF INFECTION (ALL VAGINAL OPERATIONS) BY UNITS

Period	Unit A			Unit B		
	No. of patients	No. of infections		No. of patients	No. of infections	
		All cases	With chest and urinary infections excluded		All cases	With chest and urinary infections excluded
I	41	15 (37%)	11 (27%)	35	22 (63%)	4 (11%)
II	70	35 (50%)	27 (39%)	46	43 (93%)	2 (4%)
III	62	30 (48%)	27 (44%)	33	28 (85%)	4 (12%)
Total	173	80 (46%)	63 (36%)	114	93 (82%)	10 (9%)

over a quarter of these infected cases showed frank suppuration. A few of these patients had serious infections and were very ill.

Discussion

The results were surprising in two respects. Firstly, a postoperative sepsis-rate of 48% (table III) was much higher than was expected. Even when chest and urinary infections were excluded, the incidence was 28% (table III). The incidence of suppuration (unit A) was 12%.

Secondly, the less crowded conditions in the wards and the provision of a separate operating-theatre for gynæcological cases were expected to decrease the incidence of postoperative infection but did not do so. Although the sepsis-rate after abdominal operations in unit B fell significantly in period II (table V), it was difficult to believe that this was due to the new arrangements, especially when the incidence of infection after vaginal operations in the same unit in the same period was extremely high—93%.

This suggested a fundamental difference in the management of the abdominal and vaginal cases in unit B, and such proved to be the case: after vaginal operations an indwelling catheter was left in situ for the first four days, and subsequently the patient was catheterised thrice daily until the residual urine was less than 1 oz. This may well have largely caused the high incidence of urinary infections despite prophylactic chemotherapy in 25% of these cases. The effect was that nearly every vaginal

TABLE VII—INCIDENCE OF FRANK SEPSIS (ABDOMINAL OPERATIONS) IN UNIT A

—	No. of patients	No. of infections
All infections	162	73 (45%)
Frank suppuration ..	162	20 (12%)

case in this group ultimately received chemotherapy, and this, so far as we can say, was responsible for the decrease in vaginal infection in the old ward: thus the total sepsis-rate, which was 82%, falls to 9% when urinary infections and 1 chest infection are excluded (table VI). This reduction in potential sources of infection could explain the better results obtained with abdominal cases in unit B in periods II and III (table V) when compared with unit A.

Because of differences in management of cases in the two units, the apparent difference between them shown in the tables cannot be taken as certainly due to the new arrangements after July, 1952, but suggests that the facilities may have conferred some temporary benefit in period II. This suggestion is reinforced by the fact that in the infected abdominal cases in unit A only minor sepsis was observed, during the six months immediately following the new arrangement (first half of period II). All the major sepsis developed in the second six months of period II. Unit B, on the other hand, had almost an

equal number of major and minor infections in both halves of period II.

The average incidence of postoperative infection was very high throughout the survey. What were regarded as substantial improvements in the ward and theatre facilities for the gynæcological patients did little to alter the amount of infection. Several factors may have been responsible. The most important may be that the clean and the septic cases were operated on in the same small theatre, and, through lack of isolation cubicles, were nursed by the same nurses in the wards; and all the surgical wounds were dressed in the open ward, with the inevitable result that cross-infection took place. Moreover, there was still a rapid turnover in the wards, with little chance of resting the beds and the wards; and the staff were often shorthanded and overworked. Conditions in the wards, though much improved after the changes in July, 1952, were still not ideal for maintaining a high standard of nursing. Again, any improvement in the incidence of postoperative infection that resulted in the wards may have been offset by the small size and the construction of the new operating-theatre. This was very small, with a high risk of contact infection; there was no special ventilation or air-conditioning; sterilising and sluicing were carried out in a small adjacent room through which the staff had to pass after scrubbing up; and the patients were wheeled into the theatre almost directly from the corridor.

Since the results have shown that the provision of a new ward and an additional operating-theatre did not reduce the incidence of postoperative infection, the question arises: how can this incidence be lowered?

As regards the wards, it is clear that much of the old open-ward system is inefficient: more cubicle-type wards are required, and better isolation facilities are needed for the care of infected cases. (It is in obstetric practice, with its special risk of fœtal and maternal morbidity and mortality from sepsis, that such fundamental knowledge has often been used to good purpose.)

The provision of cleaner air in the wards is obviously desirable. Bourdillon et al. (1948) has suggested a built-in suction system which may with justification be included in the hospitals of the future.

Wright et al. (1944) have shown that the sterilisation and oiling of blankets, screens, and floors in surgical wards can cut down the air content of bacteria-contaminated dust. Such a system is not always followed by a reduction in the incidence of infection (Clarke et al. 1954), because different organisms adopt other ways of dissemination.

Another approach to the same problem reverts to the principle of the old carbolic-acid spray—i.e., chemical air-hygiene, which apparently can be safely achieved with various aerosols (MacKay 1952). Bourdillon and Colebrook (1946) showed that, every time wound dressings are disturbed, thousands of particles carrying pathogenic bacteria are released into the air, and these workers recommended the setting aside of a surgical dressing-room, which, ideally, would be air-conditioned.

Operating-theatres should be spacious, well planned and should include satisfactory ventilation.

Positive-pressure ventilation with filtered air has been shown to be very valuable in preventing infection by airborne organisms (Colebrook 1955).

Such ventilation, modified to produce a down draught of filtered air over the table to avoid still-air zones where dust particles could settle over the wound, was considered by Shooter et al. (1956) as beneficial in preventing possible postoperative infection.

Electrostatic air-cleaning (Lidwell 1951) is said to reduce bacterial penetration easily to less than 1%.

Bourdillon and Colebrook (1946) showed that the movements of gowned theatre staff increased the number of airborne organisms, and Blowers et al. (1955) found the bacterial content of the air in the theatre greatest during the disturbance caused by the arrival and departure of patients to and from the operating-table, the air taking some time to settle after these movements.

Twin theatres would be a big advantage, because the operator alternates between them, thus allowing time for thorough cleaning of the resting theatre and for the air to settle between cases.

Whatever efforts are made to avoid infection from airborne organisms it is essential that the accepted theatre ritual is always closely observed. The origin of the infection and the bacteriology of the organisms involved are often obscure, as is the subsequent spread. In many hospitals planned and built years ago far more work is being done than they were intended for, and such conditions are ideal for the spread of infection. Again "carriers" of infection among the many persons employed in hospitals are an ever-present focus of infection.

Sterilisation must be efficient, and much evidence is accumulating to show that often it is not.

Bowie (1955), from a survey of sterilising apparatus in British hospitals, considered about 90% to be obsolete, and found numerous faults in design and installation—e.g., unsatisfactory mechanisms for the discharge of air and condensate from the steriliser chambers; the superheating of steam in the sterilisers, leading to ineffective sterilisation and damage to heat-sensitive articles; the absence of any means of recording the air-condensate temperature; and the connection of steriliser chambers with the underground drains and with the main hospital water-supply.

Recontamination of the contents of the sterilisers during drying is considered by Howie and Timbury (1956) to be a possibility where air filters are absent or improperly constructed.

The containers (usually metal drums) in which the articles are sterilised should be of the correct design and not packed too tightly, to allow proper steam penetration. In a busy hospital with an overworked steriliser the strong temptation to overfill drums has to be resisted. Howie and Timbury (1956) point out the importance of liaison between hospital engineer, theatre sister, steriliser attendant, surgeon, and bacteriologist in order to have a complete understanding of the particular sterilising apparatus and thus the maintenance of an efficient unit for sterilisation. Readers are also referred to the authoritative monograph by Perkins (1956), who goes into great detail and gives a most helpful account of the *Principles and Methods of Sterilisation*.

Hospital discipline must be high if minor sepsis is not to reach serious proportions. There may be a high incidence of infection in the hospital unnoticed or perhaps "accepted" until a unit suddenly becomes involved in a serious outbreak. A continual watch on the amount of sepsis not only in each unit but over all the hospital would be ideal: this may be done in various ways—e.g., a "wound book" (Shooter et al. 1956) in which all details of every infected surgical case are recorded and examined.

Colebrook (1955) recommended the establishment of full-time infection-control officers, and even a systematic check year by year on infection in hospital. By such means early action can be taken when infection becomes significant. The closure of wards and theatres at the beginning of each spate of sepsis should improve matters; but often, unfortunately, this cannot be achieved without increasing the pressure of work on the other wards and theatres still functioning. Clearly methods must be sought whereby wards and theatres can be rested periodically for thorough cleansing so that a harmful concentration of bacteria cannot be built up.

The efficacy of chemotherapy and antibiotics is almost a drawback in the prevention of cross-infection, for they take away a stimulus and, as a result, "many hospitals have not yet applied all the methods of reducing cross-infection which were shown to be of value in earlier studies" (Clarke et al. 1952). These methods cannot be ignored if the control of postoperative infection is to be

satisfactory, and they are probably of as much value as ever in dealing with resistant bacteria. To prevent the growth of resistant strains, widespread use of prophylactic drugs should be avoided.

Many of these measures to reduce postoperative infection are urgently required; for it is only by technical and structural improvements, great care on the part of each individual concerned in the treatment of the patient, and a continual watch for infection that sepsis in surgical wards can be reduced to its proper minimum.

Summary and Conclusions

An investigation was made into the incidence of postoperative infection following 651 major gynæcological operations before and after improved theatre and ward facilities had been provided for two gynæcological units in a busy general hospital.

The total infection-rate was 48%. The criteria of postoperative infection were rigorous, but about a quarter of the total infection included either abdominal or vaginal suppuration.

The provision of a new ward and an additional operating-theatre converted from two labour wards did not improve the sepsis-rate, which even rose in the latter part of the survey.

Some of the means by which postoperative infection may be reduced are discussed.

We wish to thank Dr. W. J. Clancy, of the City General Hospital, Sheffield, for permission to study cases under his care.

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CENTRAL HEALTH SERVICES COUNCIL

THE Minister of Health has appointed or reappointed the following doctors to the council and standing advisory committees for the period ending March 31, 1960:

Central Health Services Council

Prof. R. V. Bradlaw, Prof. Digby Chamberlain, * T. M. Cuthbert, O. M. Duthie, * Prof. Robert Platt, P.R.C.P., F. M. Rose, J. G. Scadding.

Standing Advisory Committees

Medical.—Professor Chamberlain, O. M. Duthie, * Sir Arthur Gemmell, * Professor Platt, F. M. Rose, J. G. Scadding, G. W. H. Townsend.

Dental.—Professor Bradlaw, A. M. Hornsnell, J. A. Moody, T. G. Ward.

Ophthalmic.—J. H. Doggart, O. M. Duthie, * A. B. Nutt.

Nursing.—A. Elliott.

Maternity and Midwifery.—Arnold Walker.

Mental Health.—John Bowlby, * F. E. Pilkington.

Tuberculosis.—Frank Ridehalgh, J. G. Scadding, G. W. H. Townsend.

Cancer and Radiotherapy—Sir Harold Boldero, Cuthbert Dukes, Prof. R. Milnes Walker, J. A. Stallworthy, Sir Clement Price Thomas, C. J. L. Thurgar, Prof. B. W. Windeyer.

* New appointment.

INCREASED REMUNERATION OF FAMILY DOCTORS

THE Ministry of Health announces that, after discussions with the medical profession, it has been agreed that the 5% increase in remuneration as from May 1 last shall be distributed among family doctors under the National Health Service as follows:

1. The capitation fee will be increased by 6*d.* to 17*s.* 6*d.* per annum.
2. The loading in respect of the 501st to the 1500th patient on doctors' lists will be increased by 1*s.* 6*d.* to 11*s.* 6*d.*
3. Initial practice allowances will be increased by 25%.
4. Hardship payments and supplementary annual payments will be increased by 20%.

It has also been agreed that the maximum allowance in respect of the salary of a trainee general practitioner will be increased by £75 to £850 a year.

The increase in the capitation fees and loadings for the months of May and June will be paid not later than July 31. The other increases will be paid at the end of that quarter (Sept. 30) but all will take effect from May 1.

Occasional Survey

IRRADIATION OF THE TESTIS

IRRADIATION of the testis is now an established experimental method of investigating the timing of the events within the tubules which add up to spermatogenesis—i.e., the development of mature spermatozoa from spermatogonia (stem cells). The assessment can be based either on regular cytological examination of the tubules after irradiation,[1–3] or on genetical analysis of the incidence of dominant lethals in successive matings after irradiation.[4–5]

It is well known that the sequence of cell-changes in the lining epithelium of the seminiferous tubules which constitutes spermatogenesis passes as a wave of activity along the tubules; thus not only will any one section of the testis at any given time show tubules at different developmental stages, but the phase of the cycle varies along the length of the individual tubule. Spermatogenesis is made up of: (1) the cycle of the seminiferous epithelium, with the successive cell types spermatogonia A, intermediate spermatogonia, spermatogonia B, and primary spermatocytes; (2) meiosis (reduction division); and (3) spermiogenesis (development of spermatids to mature spermatozoa). Leblond and Clermont [6] describe nineteen stages of spermiogenesis in the rat, based on the structural changes in the acrosome system. Using a similar classification, Oakberg [7] gives sixteen stages of spermiogenesis in the mouse, and finds that the seminiferous epithelial cycle extends over the first twelve of these stages, which are used as "markers" to determine the characteristic cell-associations of its different phases.

Spermatogonia have a high radiation-sensitivity, which increases through the developmental sequence (intermediate and B types spermatogonia). The division of spermatogonia B to form primary spermatocytes is accompanied by a dramatic shift to the radiation-response characteristic of spermatocytes. Following a single dose of 100r to the mouse testis, there is severe depletion of spermatogonia with complete loss of the B type after 5 days; repopulation begins in 10–15 days. Loss of spermatogonia is, according to Oakberg,[7] caused by cell death, rather than inhibition of mitosis, though

1. Hertwig, P. *Arch. exp. Zellforsch.* 1938, **22**, 68.
2. Oakberg, E. F. *Rad. Res.* 1955, **2**, 369.
3. Oakberg, E. F. *Amer. J. Anat.* 1956, **99**, 507.
4. Auerbach, C., Slizynski, B. M. *Nature, Lond.* 1956, **177**, 376.
5. Bateman, A. J. *Ibid*, 1957, **179**, 727.
6. Leblond, C. P., Clermont, Y. *Amer. J. Anat.* 1952, **90**, 167.
7. Oakberg, E. F. *Ibid*, 1956, **99**, 391.

some of the spermatogonia obviously survive to restart the epithelial cycle. By examining the irradiated testes at intervals up to 38 days and noting the times of disappearance and reappearance in sequence of the different cell types,[8] Oakberg determined the time-limits of the epithelial cycle in the mouse and so the total length of spermatogenesis. According to his reckoning, the seminiferous epithelial cycle takes on average $8^1/_2$ days, and thus the time required for the maturation of one generation of spermatozoa (in the mouse) is 34 days. Earlier estimates of 26 days for spermatogenesis based on the uptake of labelled material,[8 9] are probably due to errors in cell classification and confusion of spermatocytes with spermatogonia, giving an underestimation of 25%.

By ascertaining the relative frequency of a given stage of the cycle in a random sample of mouse tubules, it was possible to assign time-limits to each tubule-stage and thereby to each phase of cell development. On the basis of genetical evidence, Bateman,[10] gives an estimate of 6–7 weeks between spermatocytes and ejaculation of sperm, but following data supplied by Sirlin and Edwards[11] he agrees[5] that this is probably an overestimate, and represents the total time of spermatogenesis plus an average of 7·5 days for the transit of mature sperms from testis to ejaculate.

With the information now available "it should be possible to select tubule stages and post treatment time in such a manner that the radiation sensitivity of any given spermatogenic cell may be determined."[3] Auerbach[12] believes that there is a parallel radiation-sensitivity pattern of testis in drosophila and mouse, and thus that we may be dealing with a fundamental property of male germ-cells.

Oakberg[7] reports an incidence of degenerating cells, particularly spermatogonia A, in the normal mouse testis. He regards this as a selection against the more drastic chromosomal aberrations and possibly even genic changes during cell multiplication and growth. Such cell-necrosis is not, however, a normal feature of other actively mitotic epithelium, and it is tempting to relate it to the high radiation-sensitivity of these stem cells. As cytological techniques improve, it should become possible to detect with some assurance non-lethal chromosomal damage of cell types, denoting potential mutated sex-cells.

It seems that there must be some local mechanism integrated with the general hormonal control to maintain the timing and spacing of the cycle of cell-differentiation in the different tubules, and the recurring cell-associations characteristic of each stage of development.

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9. Sirlin, J. L., Edwards, R. G. *Exp. Cell Res.* 1955, **9**, 596.
10. Bateman, A. J. *J. Genet.* 1956, **54**, 400.
11. Sirlin, J. L., Edwards, R. G. *Nature, Lond.* 1957, **179**, 725.
12. Auerbach, C. *Ibid*, p. 725.

Parliament

The Government and the Piercy Report

IN an adjournment debate on June 7 Mr. ROBERT CARR, parliamentary secretary to the Ministry of Labour and National Service, reported progress on the implementation of the Piercy report.[1] Dealing with the group of recommendations on the hospital and medical services he said that all the departments concerned and representatives of the medical profession itself were considering what could be done to give general practitioners and consultants more information about the scope, nature, and potentialities of rehabilitation. The health Ministers were shortly to advise hospital authorities on points raised by the committee's support of planned and purposeful physiotherapy and of the tendency of occupational therapy to offer more realistic occupations and advice and help on how to live with a disability. Each hospital would be asked to consider setting up a rehabilitation committee of its own, and every large hospital would, it was hoped, set up a resettlement clinic to review difficult cases of disablement. These clinics had proved valuable not only in dealing with the problems of individual patients but also as a means of drawing together the different agencies concerned in rehabilitation and resettlement. Hospital boards would also be asked to have regard to the needs of rehabilitation departments in drawing up their capital programmes. But clearly development must be conditioned by the availability of funds and staff. It was essential that we should make the best use of existing resources before seeking to expand them.

Pharmaceutical Services Committee

The Minister of Health has set up a committee with the following terms of reference:

Having regard to the increased cost of prescriptions issued in the National Health Service, to investigate the factors contributing to this cost and to make recommendations.

The members of the committee are:

Sir HENRY HINCHLIFFE (chairman), a member of St. Mary's Hospital, Manchester, H.M.C. and director of the Manchester chamber of commerce; Dr. WILLIAM BROCKBANK, dean of clinical studies and lecturer in medicine, Manchester University; Mr. K. E. CAPPER, PH.D., editor of the *British Pharmaceutical Codex* and joint secretary of the National Formulary Committee; Dr. H. C. FAULKNER, member of the General Medical Services Committee and assistant M.O.H., London County Council; Dr. F. E. GOULD, member of the General Medical Services Committee and secretary of the Birmingham local medical committee; Dr. D. V. HUBBLE, physician, Derby Royal Infirmary; Dr. C. A. KEELE, professor of pharmacology and therapeutics in London University at Middlesex Hospital Medical School; Mr. M. G. KENDALL, SC.D., professor of statistics, London University; Dr. A. M. MAIDEN, a rural practitioner and member of the General Medical Services Committee; Dr. A. D. STOKER, a rural practitioner and member of the General Medical Services Committee; Dr. A. P. THOMSON, dean of the faculty of medicine and professor of therapeutics, Birmingham University.

One appointment is outstanding. It will be filled by another general practitioner, and it is expected that he will be from Wales.

1. See *Lancet*, 1956, ii, 986.

QUESTION TIME

Influenza Precautions

Sir FRANK MEDLICOTT asked the Minister of Health what steps were being taken by his department and by the public-health authorities generally to deal with the possibility that the new form of influenza which was now raging in the Far East might spread to Europe and reach Great Britain.—Mr. DENNIS VOSPER replied: The outbreaks of influenza in the East are being caused by a new variant of the virus, but all reports are that the illness is clinically mild in character. There are standing arrangements for information to be supplied about outbreaks of influenza in this country through general practitioners, industrial medical officers and others, and port medical officers report epidemic influenza among persons arriving in this country. As a precaution, practitioners are now being reminded of these arrangements. The characteristics of this new strain of virus are being investigated at the World Influenza Centre and in other research departments.

North Staffordshire Royal Infirmary

Dr. BARNETT STROSS asked the Minister of Health whether he was aware that the closure of the operating-theatre in this hospital was causing pressure on the other hospitals in Stoke-on-Trent and that both patients and medical staff were inconvenienced; and when the new theatre would be completed.—Mr. VOSPER replied: I am aware of the difficulties which have unfortunately resulted from the closure of these theatres. The regional board has arranged for beds to be available in another hospital for certain surgical cases, and for extra operating sessions at two further hospitals. It proposes to provide a temporary operating-theatre at the Royal Infirmary as soon as possible, and hopes to be able to provide a new permanent twin-theatre suite within two years.

At the end of 1956, in England and Wales 6247 mental defectives were awaiting admission to institutions.

In England Now

A Running Commentary by Peripatetic Correspondents

THE life of a medical registrar in England, to judge by the articles now appearing in a Sunday paper, has many drawbacks and is far from exciting. How different things can be in tropical Africa. Twice the amount of work, constant difficulties such as inadequate drugs and equipment, but always something out of the ordinary just around the corner, or perhaps—more accurately—a little further away.

Last week my chief called me in and asked me whether I would care to see a patient for him as he was unable to do so, and would I contact the local G.P. ? From the G.P. I learned that the patient lay ailing far across Lake Victoria. As money was no particular object, an aeroplane had been chartered to take the " specialist " (me), the G.P., and two of the patient's relatives to the bedside. There were a few seats vacant, said the G.P., and would I care to take my wife along ? My wife had slipped another spool of colour-film into her new camera almost before the telephone was back on its stand.

A rainy Sunday morning saw us setting out over the lake, the E.C.G. machine tightly strapped into a seat of the aged de Havilland aircraft. Visibility was limited by driving rain and black cloud. I began to regret my eagerness to be airborne. Suddenly a thin ribbon of blue sky appeared ahead of us and soon we were flying through brilliant sunshine, with small wooded green islands below and in the distance the green shores of Tanganyika. Then over small thatched huts, each surrounded by its grove of banana trees, an occasional splash of colour from a woman's dress, and a peculiar three-dimensional effect as we passed over the tall palm-trees. My wife's camera clicked furiously, while I wondered whether this was all in keeping with the serious nature of our mission and tried hard to look as if it was all her own idea anyway, and her camera. Down to earth, where a large Mercedes-Benz whisked us into the small town nestling among dark green-brown hills which sloped down to the remarkably blue lake. It seemed for all the world like a scene from a Western movie, rather ramshackle and a shade dusty, with figures sprawled idly on verandahs in the sunshine.

The patient had responded rather well to the local doctor's treatment, and sat perched on his bed eagerly awaiting the visitation. While I took his history, a steady flow of friends and neighbours passed through the room; a quiet hum of agitated whispering accompanied our conversation. But it all seemed so accepted a procedure that I had not the heart to empty the room. By the time it came to examining the patient the audience had grown. Small children peered in at the doors and windows, and only by dint of persuasion could I thin the spectators to a respectable number for a rectal examination. We soon discovered that the electrical fittings were unsuitable for the E.C.G. machine, and after a hurried consultation the local electrician and his mate appeared. Large quantities of wire and equipment strewed the floor and finally we were ready for the actual recording. Once again the room was crowded, and it was all I could do to preserve my gravity amid the obviously admiring throng of men, women, and children. I can hardly be blamed for using twice the usual amount of paper. While I sat looking at the record, the patient's business partner decided that a little of the limelight should fall in his direction and amid sighs and groans prostrated himself gently on a bed in the next room, insisting that he be seen by the specialist as soon as possible. I think he had visions of his partner's rapid retirement and wanted to stake his own claim to physical disability before it was too late.

All this time my wife had been on a sightseeing tour of the district. On her return it was only proper that she should be brought in and introduced to the patient and his friends. To the joy of the assembled gathering and to my wife's embarrassment she was solemnly presented with a beautifully embroidered handbag. After all this there could be no unceremonious rush to the airfield, but a gentle drive into the hills above the town, through the coffee-plantations and past the beach where a notice warned one to be careful of the hippopotami which came out of the lake in the evenings and wandered through the gardens. A quiet lunch at the hotel looking over flaming cannas and gleaming yellow cassia trees to where the waves broke on the sandy bay, and then the time had really come to leave.

Flying back I reflected how different this all was from the daily routine I had known in England, and looking down on the sparkling waters, the small canoes paddling between the islands, and the white birds circling slowly below, I gave thanks for the opportunities that still exist to lead a life that is just that little bit different.

* * *

My patients used to come into the waiting-room worried, depressed, and sometimes bored, only to find others in the same unhappy state. Some picked up the torn and dog-eared magazines on the table to while away the time. Others chatted in lugubrious tones with their fellow sufferers. All were concerned with their own ailments more than anything else.

Since I have hung on the wall an example of abstract art all is changed. Two patients look at it and after some strongly worded criticism agree cordially that it is all nonsense. But they go on making comments as they continue to look at it, and for the moment at least forget their troubles. Another patient looks at the picture and wonders if there could be something in it which is not readily apparent. He studies it, compares it with conventional pictures, and forgets the pain in his leg. To another patient the painting comes as a refreshing shock. Perhaps to another it tells a story. Another seeks to justify it, either to himself or to his neighbour, as a work of art.

Whatever one may think about it as " art," my picture has banished apathetic gloom from the waiting-room.

* * *

The pathologist's report on an unremarkable appendix read (perhaps somewhat less than ceremoniously) " vermiform appendix." The surgeon, who was temperamentally non-vermiform, read the two words and, turning to the small company which had forgathered to savour his counter-attack, declared " What did I tell you ? Worms in the appendix. Bad things, worms." His last word may have been his counter-attack.

* * *

For the patient life in hospital is curiously unreal. Doctors make sporadic appearances. The H.S. acknowledges the fact that you're human and makes encouraging remarks from time to time about getting up. The Registrar appears in the middle of evening ablutions and does not stay. He promises to return. The Consultant, accompanied by the H.S. looking serious, looks at you briefly and then at your case-notes at the end of the bed and goes away talking about an entirely different patient.

You begin to believe that you're not who you thought you were. This thought is encouraged by the arrival of two ominous-looking visitors in black, with black ties. You can almost feel them measuring you up to see if you will fit into one of their existing coffins or whether they must make another. However, they introduce themselves, obviously under the impression that they know who you are, but this doesn't help at all. One is someone's father, which is fairly reasonable, and you make conventional remarks about how nice to see them and how good of them to come. They say that they expect your parents will return to Ashby de-la-Zouch in the morning; you're not quite clear-headed enough to say that perhaps you're not the person they think you are and mutter something about your parents not living in Ashby de-la-Zouch. They take their leave suddenly and you wonder whether, perhaps, you do not come from Ashby de-la-Zouch after all.

* * *

I'm a-sittin at ease in me parlour
On Sunday, the second of June,
Takin Elgar's " The Dream of Gerontius."
It's a luverly arternoon,
When they calls me to see Mrs. Uxtable
—A thing wot they frequently do—
So I ops to er elp as per usual
—And when I gets ome the Dream's through.
Now I ain't one to grouse about hours,
Don't ask to be paid overtime,
But when they cuts into me culcher
I calls it a perishin crime.

Letters to the Editor

RADIATION AND INFLUENZA MUTATION

SIR,—The wise suggestion in your annotation of June 8 that we should get ready for a winter epidemic of infection by the new variant of influenza virus A that is now ravaging South-east Asia, prompts some consideration of the possible origin of the variant. Viruses share with more elaborate organisms the ability to mutate under the influence of radiation. Mutations in all organisms are more likely to be detrimental than advantageous, but the probability of advantage becomes greater the simpler the organism. It is among the viruses therefore that increased radiation is most likely to lead to an improvement in performance. One aspect of improved performance is the ability to circumvent the specific immunity of the population that is being attacked and this is what the new variant of influenza seems to be able to do.

Mutations, whether in people or viruses, do not carry labels explaining their origin. What is expected as a result of increased radiation from nuclear bombs or other sources is simply an increased frequency of mutation. East Asia is the area that has already suffered most from "fallout" coming from both Siberian and Pacific tests. There is therefore no intrinsic improbability in the idea that this influenza epidemic is yet another evil consequence of these tests.

Harpenden. N. W. PIRIE.

HYPERTENSION: PRESYMPTOMATIC DIAGNOSIS AND TREATMENT

SIR,—I was interested to read Professor Sanjivi's letter of Feb. 2 and would like to comment on some controversial points he raised.

He says "we are not unduly nervous about telling a patient that he is suffering from tuberculosis, valvular heart-disease, or diabetes. Why should then we continue to teach that it is best not to tell the hypertensive patient that his blood-pressure is raised?" Professor Sanjivi perhaps ignores the fact that we know little about the pathogenesis of hypertension. It may be a psychosomatic disorder, where stress and psychological upsets play a big part. If so, telling the patient that he has "hypertension" will still further trouble his already agitated psyche. By telling his patients that they have hypertension, Professor Sanjivi may have done great harm and made them more conscious of their mercury levels. Patients with slightly raised blood-pressure, as in the case he quoted, seldom complain of symptoms apart from those of "anxiety neurosis." These symptoms respond readily to reassurance, regulation of life, avoidance of hurry and worry, and a sedative. To measure a patient's health by his mercury column is to do him the greatest disservice. Professor Sanjivi is happy about his results, but he should realise that the patients he is treating with hypotensive drugs could have equally well responded to reassurance and sedation.

He continues, "The classification of essential hypertension into benign and malignant is completely misleading. It should be given up." I think this is going too far. Malignant hypertension has a poor prognosis and requires aggressive treatment by ganglion-blocking agents or by sympathectomy. If Professor Sanjivi does not like the word "benign," he may call it "non-malignant" hypertension. I think the classification of hypertension into benign, accelerated, and malignant forms might satisfy him.

I think that the benign and malignant types are in fact two different diseases having in common only the raised blood-pressure. The characteristic lesions of benign hypertension are hyaline degeneration of intima of small arteries and medial hypertrophy of muscular arteries. The essential lesion of malignant hypertension is fibrinoid necrosis of arterioles. Clinically the brunt of benign hypertension is borne by the coronary and cerebral arteries, the patient usually dying of congestive heart-failure, coronary thrombosis, or cerebral thrombosis. Not more than 10% of patients die from renal failure. But in malignant hypertension, the disease runs a very acute course, most patients dying of renal failure. Hypertensive encephalopathy and cerebral hæmorrhage are not uncommon. Cardiac involvement, however, is uncommon, though acute left ventricular failure is sometimes seen. The patients with benign (non-malignant) hypertension may live about a normal span, but without treatment patients with malignant hypertension seldom survive more than eighteen months. The occasional transition of benign into malignant hypertension may be taken as evidence against this concept. I believe that, pathologically and clinically, benign and malignant types of hypertension are so different that it is not very logical to regard them as different varieties of one disease of unknown ætiology. If the course of benign and malignant hypertension is analysed in many cases, the two types of hypertension may turn out to be two different diseases, as in nephritis types I and II. Occasionally type I nephritis may become "nephrotic," and the clinical picture resembles type II nephritis; perhaps, in the same way, benign hypertension occasionally becomes malignant.

Professor Sanjivi writes: "Of the many fallacies surrounding essential hypertension, perhaps the most serious is that there is no hypertension in the rice-eating people of the East." I believe he underestimates the significance of the rice diet. Its hypotensive qualities are essentially due to its low salt content. Hypertension may be common in Madras where people take too much salt and spices, but its incidence is certainly very low among rice-eating people in the East—e.g., in the Hyderabad division of West Pakistan, where salt intake is not so great. Indeed, the lower incidence of hypertension in the tropics (mostly backward countries of the world) may partly be explained by excessive loss of salt in sweating, especially during the summer, which lasts for about eight months a year in Pakistan and India. In most patients from the countryside with hypertension the disease is secondary to pyelonephritis, renal calculi, or other disorders. In my experience in Pakistan, the prevalence of essential hypertension is directly proportional to the stresses to which a person is exposed, and the incidence is enormously high in educated people holding executive or professional jobs; and the disease is more prevalent in big cities than in villages.

Liaquat Medical College,
Hyderabad, West Pakistan. ALI MUHAMMAD.

STEATORRHŒA AND HYPERPARATHYROIDISM

SIR,—I have read with interest Professor Dent's letter (June 8) in which he expresses surprise at the simultaneous occurrence of the biochemical features of hypoparathyroidism and the radiological features of hyperparathyroidism. He proposes to call this condition "hypo-hyperparathyroidism," and believes that it can be explained only by destroying "one of our present concepts."

In your annotation of May 25, however, you draw attention to the fact that tetany (with the biochemical features of hypoparathyroidism) may occur in rickets and which suggests a possible explanation for this course of events—namely, that parathyroid overactivity, giving rise to rickets, may go on to parathyroid "exhaustion," giving rise to tetany.

This explanation adequately accounts for the contradictory features of Professor Dent's two cases without destroying any of our present concepts and without introducing a self-contradictory neologism.

Gardiner Institute,
Western Infirmary,
Glasgow, W.1. JAMES CROOKS.

SIR,—In his letter of May 25 Dr. Jackson suggests that the simultaneous occurrence of steatorrhœa and *idiopathic* hypoparathyroidism, described by several

authors and also by Salvesen and Böe,[1] cannot be fortuitous, and he believes, that this combination is a definite "syndrome." He also mentions our analysis of 85 cases of steatorrhœa, in which we concluded that hypoparathyroidism often exists in this condition, because the serum-calcium remains low, instead of being raised by increased activity of the parathyroids, whose function it is to keep the serum-calcium at a normal level. But this is a *secondary* hypoparathyroidism, which we have seen in relation to the effect of undernutrition on the endocrine glands, so apparent in sprue.[2]

The hypocalcæmia in ordinary cases of sprue is primarily caused by vitamin-D insufficiency and by loss of calcium as calcium soaps with the fatty stools. In the "syndrome" cases mentioned by Dr. Jackson the hypocalcæmia is primarily due to an existing *idiopathic* hypoparathyroidism and the development of steatorrhœa with fæcal loss of calcium should tend to aggravate the hypocalcæmia. These two different kinds of hypoparathyroidism in sprue should not be confused.

We have pointed out[1] that bone lesions of osteomalacia seem to be more pronounced in the cases with a normal or nearly normal serum-calcium and a low serum-phosphorus, indicating a high activity of the parathyroids with resultant loss of calcium from the bones. The secondary hypoparathyroidism in other cases in a certain way protects the bones, but exposes the individuals to the dangers of tetany.

University Medical Clinic B,
Rikshospitalet, Oslo, Norway. H. A. SALVESEN.

FATAL CARDIAC ARREST WITH FLUOTHANE

SIR,—Dr. C. A. Foster has given a timely warning (June 1) that 'Fluothane' (halothane) is an extremely powerful anæsthetic, and if pushed to high concentration will cause a dangerous fall of blood-pressure, and, in an unatropinised patient, rapid cardiac arrest.

Fluothane allows a quiet trouble-free induction without laryngeal or bronchial irritation, and stabilisation of anæsthesia is quickly obtained; and, so long as the patient breathes automatically, and there is no excessive fall in blood-pressure, there is no safer non-explosive volatile agent. But it is essential to keep constant record of the blood-pressure, preferably by an oscillometer, as apart from the lengthening of expiration which, with the quiet breathing associated with halothane anæsthesia, may be difficult to detect, the falling blood-pressure is the most important warning of increasing blood concentration.

Owing to the present cost, closed-circuit techniques have naturally become popular. Using a Waters' canister, completely closed, a flow of not exceeding 1 litre of oxygen blown over the surface of a fully open Boyle's bottle, containing 40 c.cm. of fluothane, will produce adequate light anæsthesia with practically no fall in blood-pressure.

Bronchial relaxation is so complete that respiration is easily controlled. It must be remembered, however, that under such conditions it is only too easy to reduce venous return to the heart by increasing intrapleural pressure and so lower the blood-pressure; if at the same time the concentration of fluothane has been in any way increased, cardiac arrest is possible.

This is no condemnation of fluothane, but of the technique. Fluothane is an excellent anæsthetic agent. Its ease of administration is perhaps its greatest danger, because with a powerful drug a demand is essential for greater vigilance.

Christie Hospital & Holt
Radium Institute,
Withington, Manchester, 20. W. B. BACON.

1. Salvesen, H. A., Böe, J. *Acta med. scand.* 1953, **146**, 290.
2. Perloff, W. H., Laschè, E. M., Nordin, J. H., Schneberg, N., Wieillard, C. B. *J. Amer. med. Ass.* 1954, **155**, 1307.

IMMUNOLOGY OF THYROID DISEASE

SIR,—Professor Wyburn (June 1) has drawn attention to the pioneer and apparently forgotten work of Leo Loeb in the field of tissue transplantation and organ specificity.

This prompts me to point out that Loeb[1] also invented tissue-culture, ten years before the classical paper of Ross Harrison[2] who is usually credited with the discovery. Furthermore, Loeb and Fleischer[3] were the first to culture adult mammalian organs in vitro. In this work they discovered the importance of using a gas phase of oxygen rather than air, when adult, as distinct from embryonic, tissues were to be cultivated. Even today this latter point is not fully appreciated.

M.R.C. Radiobiological Unit,
Harwell, Berkshire. O. A. TROWELL.

SIR,—In your leading article of May 25 you suggest that the initial event in Hashimoto's disease is a leakage of thyroglobulin from the acini; and that the complement-fixing antibody is specific for extracts of thyrotoxic glands.

If this is true a high incidence of Hashimoto's disease should be found among cases of hypothyroidism following partial thyroidectomy, and the search for antibodies and the histological examination of the thyroid remnants in these cases would be rewarding.

Supporting this idea is the fact that postoperative hypothyroidism is much commoner in Graves's disease, where thyrotoxic tissue must be cut across, than in toxic nodular goitre, where the toxic tissue is usually removed intact.[4] Bartels states also that a high incidence of "strumitis," defined as "excessive lymphocytic infiltration and fibrosis," is found in the resected specimens in cases where hypothyroidism subsequently develops.

Perhaps it is stretching the idea too far to suggest that the rather surprising success of partial thyroidectomy in Graves's disease may be partly due to the "Hashimoto process" initiated by surgery.

Boscombe, Hants. A. POLLARD.

ANÆSTHESIA FOR CÆSAREAN SECTION

SIR,—I am interested in the anæsthetic implications of the article on elective cæsarean section and neonatal deaths by Dr. Strang and his colleagues (May 11).

While there are no anæsthetic details, the phrases "The times taken to establish normal respiration (mean 5 minutes) are longer than after vaginal delivery. This delay was probably due to the maternal anæsthesia" and "The baby is usually anæsthetised" deserve comment.

In the Blackburn Hospital Group we have for some time used a method of anæsthesia for cæsarean section which does not anæsthetise the infant, and spontaneous normal respirations usually occur within a minute of delivery.

The mother is visited by the anæsthetist on the day before operation for the usual preoperative examination, and a full explanation of preoperative procedure. She is given a barbiturate sedative the night before operation and where the operation is to take place in the afternoon, she might also be given methylpentynol three to four hours before coming to theatre. Atropine gr. $^1/_{100}$ is given 45 minutes before operation, and in theatre all the skin preparation, towelling, &c., is done before the anæsthetic induction. When all is ready, 0·3 or 0·4 g. of a $2^1/_2$% solution of thiopentone mixed with 80 mg. of gallamine ('Flaxedil') is injected intravenously, followed by 25–30 mg. of pethidine. A syringe containing 0·5 mg. ergometrine is attached to the same needle, and strapped to the arm so that it can be injected immediately the baby's head is born. The incision is made as soon as the thiopentone-gallamine injection is completed. The maternal

1. Loeb, L. Über die Entstehung von Bindegewebe, Leucocyten und roten Blutkörperchen aus Epithel und über eine Methode, isolierte Gebewesteile zu züchten. Chicago, 1897.
2. Harrison, R. G. *Anat. Rec.* 1907, **1**, 116.
3. Loeb, L., Fleischer, M. S. *J. med. Res.* 1919, **40**, 509.
4. Bartels, E. C. *J. clin. Endocrin.* 1953, **13**, 95.

lungs are inflated with a mixture of 50% nitrous oxide in oxygen. The infant is delivered usually within 3 min. The longest time taken has been $3^3/_4$ min., and the shortest $2^1/_4$ min. from the anæsthetic injection. Most infants are a good pink colour and cry lustily immediately and even before separation from the placenta.

Since we have been using this method, I have not known it to be necessary to use resuscitative measures, apart from dry suction of mucus from the nasopharynx, which is done by the surgeon or his assistant before the baby is handed to the waiting midwife.

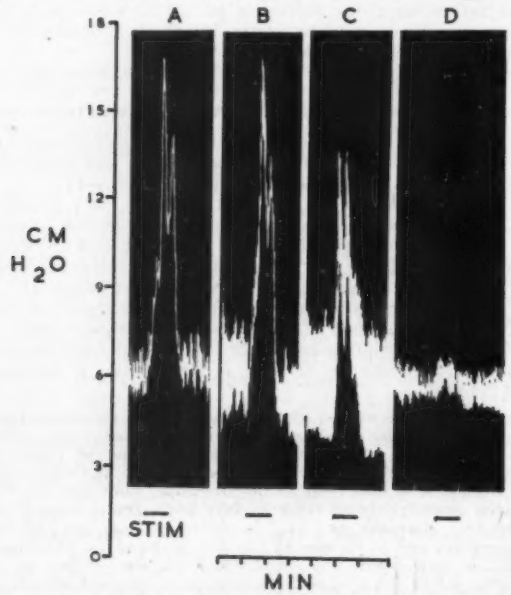
Once delivery is complete, anæsthesia proceeds as for any abdominal operation, an endotracheal tube being passed if necessary. As a rule, the mother is allowed to recover consciousness as soon as the last stitch is inserted, and she knows the sex and weight of her baby before she returns to the ward.

Blackburn. MARGARET C. WATKINSON.

DUODENAL ULCER

SIR,—As long-term studies of vagotomy and gastro-enterostomy come to be published, it seems that this operation may prove to be better than gastrectomy in the treatment of chronic duodenal ulceration. Mr. Hindmarsh (June 1) stresses the importance of complete nerve section, and it would seem that section of all nerve trunks is of crucial importance in the operation. Hitherto no method has been available for testing completeness before the abdomen is closed.

We have developed a simple and safe technique which records quantitatively gastric motor function in response to vagal-nerve stimulation. Used initially on animals, it has now been successfully applied to man. The method (later to be published in detail) consists in recording intragastric-pressure changes in response to vagal-nerve stimulation applied by an electrode around the lower end of the œsophagus. Not only can major trunks be demonstrated in this way, but so too can fine trunks which might have been otherwise overlooked (see figure).



Effects of vagal stimulation on stomach motility. Fluctuations in baseline are due to respiratory movements. At each mark, vagus nerves were stimulated for 1 min. with 2 msec. shocks at a rate of 10 per sec.

A, Before nerve section.

B, After cutting the posterior nerve.

C, After cutting a large anterior nerve. A rise in pressure was still obtained, showing that a nerve trunk remained undivided. This was found and cut.

D, The effect is abolished, showing that no trunks remain in continuity.

We would like to thank Professor Sir Lindor Brown for his advice and Dr. E. H. L. Harries for his help in the early stages of this work.

West London Hospital, W.6, and Department of Pharmacology, Royal College of Surgeons of England. HAROLD BURGE
J. R. VANE.

INJURY DUE TO ATOMIC EXPLOSION

SIR,—The reporting of the American Surgical Association's meeting, in *The Lancet* of May 25 (p. 1071), has gone astray in the first two paragraphs.

None of the Marshallese died. The 50% mortality at 200r (which none of them suffered), even if it be only a misprint for 5%, is probably excessive in any circumstances.

In the subsequent paragraph, which deals with facts as to the effects of radiation on dogs, there is included an opinion as to surgery for humans which is, to say the least of it, open to doubt. It is only too easy to extrapolate from limited experimental experience to dicta as to probable happenings in man.

London, W.1. E. ROCK CARLING.

THE CHILD'S RIGHT TO ADOPTION

SIR,—Adoption is a controversial subject on which many people express strong views. Some points, however, are so delicate, or are thought to be so much at variance with public opinion, that they are rarely discussed openly. For instance, although there is no legal bar to the adoption of legitimate children, it is in fact difficult to achieve, because most adoption societies and children's officers reflect public opinion and refuse even to consider such a proposal.

The arguments usually put forward against it are that parents must be made to accept their responsibilities; that relieving them of their unwanted children would encourage them to have more; and that it would encourage irresponsibility, and be a threat to family life. All these arguments may be valid, but by taking this view society is surely sacrificing the real interests of many children—perhaps in order to gratify its own desire to punish the parents.

Anyone who works with children knows that there is no more pathetic and tragic group than those who are, and always have been, unwanted. Though they may suffer no overt neglect or cruelty, they present problems of disturbed behaviour, delinquency, and psychosomatic illness which are intractable; for if a child is unwanted no amount of outside help can ever make him feel wanted. If we admit that to be unwanted is about the greatest misfortune which can befall a child, are we not under an obligation to avert it whenever possible by making adoption easier?

If such children were accepted for adoption, society would benefit by the decrease in the number of misfits and delinquents; the adopting parents, who now wait years on the lists of adoption societies, would benefit by gaining a child sooner; and the actual parents would benefit by relief from a burden which they resent. Most important of all, the children themselves would have the chance of a happy family life.

As it seems to be so much to everyone's advantage, why is it not allowed? Partly, perhaps, because the public does not understand the extent of the problem, but also because society seems to think that it is a sin for parents not to want or love their children and that somehow they can be made to do so. It would be more realistic to accept the regrettable fact that some parents do not, and never will, love their children. It is fruitless to argue that they should not have them if that is how they feel about it; for despite admonition, censure, and

moralising, unwanted legitimate babies will continue to be born.

It will inevitably be argued that this change would open the gates to abuse and complications. But an abuse does not invalidate a principle, if the principle is generally accepted. The rules governing all good adoption procedure would naturally have to be applied, and care taken to weigh carefully the best long-term interests of each baby, its real parents, and its adopting parents. It would be naïve to pretend that adoption is always successful, but it seems the best possible means of dealing with this tragic situation.

A second point which is seldom discussed, because we have in this country a deep respect for each other's religious beliefs and differences, is the denominational bar. There is at present a shortage of Roman Catholic adopting parents and as a result many illegitimate babies of Roman Catholic mothers are denied the chance of adoption and are brought up in baby homes. A mother's wishes about the religious upbringing of her child must be respected, but, where mothers only claim denominational membership for form-filling purposes and have no real feeling about it, it seems to me wrong to allow this label to prevent babies from being adopted when there are so many parents waiting to give them a home.

B. M. HUNTER
Almoner.

Manchester, 14.

HOME CONFINEMENTS

SIR,—About this time last year you assisted the London Regional Obstetric Committees by publishing a letter of mine [1] to the effect that, save in exceptional circumstances, practitioners who qualified after Jan. 1, 1951, and who wished to be included in the London list of general-practitioner obstetricians would, as a condition of admission to that list, be required to have held a resident house-job in obstetrics for a period of six months. It was then indicated that any applications received prior to May 1, 1957, would be considered in the light of the conditions which obtained prior to that date.

At the instance of the London Obstetric Committees I would again ask for the hospitality of your columns to remind all prospective applicants that the new requirements are now being put into effect.

J. A. SCOTT
Chairman,
London Local Obstetric Committee.

Public Health Department,
County Hall,
London, S.E.1.

CHILDREN IN HOSPITAL

SIR,—As a layman whose occupation includes the reading of medical journals, but also as a parent, I was surprised to find that it was necessary to use six of your columns to demonstrate, in Dr. Vaughan's article of June 1, what any intelligent parent could have told your readers—namely, that a simple, reassuring explanation given to children admitted to hospital will almost inevitably satisfy them. Indeed, very much could be learned by the staffs of our hospitals if they would consider, more rationally, the need for reassuring even their adult patients. It takes very little imagination to realise that people admitted to hospital are almost invariably frightened and disturbed, and that by overcoming this very real upset in their lives as far as possible, much will be done to ease their suffering. So much good is done that it makes the notable lapses much more difficult to understand.

Surely it can now be accepted that nearly all patients are much happier to know what is going to happen to them and to be relieved of the many and largely unfounded fears with which, quite understandably, they torment themselves.

One simple solution, already used, I believe, by the more enlightened, is to have printed cards telling patients or relatives as much as they need know to give them some degree of reassurance. It would be a rather grave indictment of those responsible if it should prove necessary to have hospital staff whose sole duty was to reassure patients and make their hospital experience less frightening.

MEDICAL ABSTRACTOR.

1. *Lancet*, 1956, i, 159.

SEASONAL INCIDENCE OF MEGALOBLASTIC ANÆMIA OF PREGNANCY AND THE PUERPERIUM

SIR,—The results in Dr. Thompson's interesting article of June 8 might not represent the true seasonal incidence of the disease unless all the cases which occurred during the period under review, were diagnosed. Dr. Thompson has reviewed a series of 105 patients, collected from three hospitals during a period of twenty-three years, but it seems probable that the total number of cases occurring during this period would be considerably higher than this.

During 1956, 30 cases of megaloblastic anæmia of pregnancy and the puerperium were diagnosed at Whiston Hospital, Lancashire, and it is unlikely that there were any other cases, in which the diagnosis was missed. The monthly incidence of parturition in these cases can be obtained with accuracy and the results agree closely with those of Dr. Thompson (see accompanying table). The seasonal incidence of the onset of the anæmia cannot be determined with sufficient accuracy to give exact figures for each month. However, the figures are sufficiently accurate to confirm Dr. Thompson's findings that the highest incidence of the onset of the anæmia is during the late winter and spring.

SEASONAL INCIDENCE OF ONSET OF MEGALOBLASTIC ANÆMIA AND OF PARTURITION

Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Delivered	1	3	3	7	7	1	4	0	0	1	1	2	30
Onset ..		17			8			2			3		30

J. W. B. FORSHAW.

Liverpool, 18.

EFFECTS OF CARBUTAMIDE ON CARBOHYDRATE METABOLISM IN DIABETES

SIR,—Professor Bastenie's findings [1] seem to indicate that under treatment with carbutamide (B.Z. 55) both outflow of glucose from the liver, and resynthesis there, decrease. We have studied, in the rabbit, the effect of carbutamide, with or without cortisone acetate, on the rise of blood-sugar following the fall induced by 10 units of insulin given intravenously. With insulin by itself, such a high dose ensures a significant rise of the blood-sugar—i.e., outflow of glucose from the liver.

Mild alloxan diabetes responds to carbutamide, but grave alloxan diabetes and diabetes caused by cortisone remain uninfluenced.[2] Cortisone may inhibit the peripheral effect of insulin, but increases glucose production in the liver. If carbutamide is really capable of decreasing the outflow of glucose from the liver, the post-hypoglycæmic blood-sugar rise must also be decreased.

Male rabbits of the same breed, weighing about 3 kg., were used in the experiments. We had previously observed, on administration of 10 units of insulin, a significant fall followed by a rise in the blood-sugar level. The effect of the insulin lasted four hours, and it rarely caused hypoglycæmic shock. Blood-sugar curves after giving 10 units of insulin intravenously are, accordingly, well suited for comparative examinations.

Relatively high (therapeutic but not toxic) doses of carbutamide were administered—viz., 1·5 g. daily for three to four days. On the last day of the experiment, four hours after the

1. Bastenie, P. *Lancet*, 1956, ii, 628.
2. Peters, G. *Dtsch. med. Wschr.* 1957, **82**, 311.

morning dose, the insulin was given to the fasting rabbit. The rabbits treated with cortisone acetate were given 5 mg. intramuscularly at 8 A.M., and 10 mg. at 4 P.M. Hypoglycæmic attacks were seen in no case during the experiments.

The morning blood-sugar of the control animals (also during carbutamide therapy) was around 108 mg. per 100 ml., and in the animals treated with cortisone acetate 142 mg. per 100 ml., whether or not carbutamide was administered. When carbutamide was given there were moderate rises as well as falls in the blood-sugar in the early hours. In the cortisone-treated rabbits, the average fall in blood-sugar after insulin was 91 mg. per 100 ml. and the following rise 63 mg. When carbutamide was given the average fall was 69 mg. and the rise 68 mg. The corresponding figures in the controls were 85 mg. and 58 mg. without carbutamide, and 60 mg. and 49 mg. with carbutamide.

This means that, in spite of carbutamide treatment, there was a significant outflow of glucose from the liver.

First Department of Pædiatrics, Budapest University Medical School.

L. BARTA
G. SIMON.

NEW METHOD OF PROMOTING LABOUR

SIR,—We have developed a new and natural method of promoting labour based on Verney's experiments with antidiuretic hormone in dogs.[1 2] For this purpose we use an intravenous infusion of hypertonic saline solution on the assumption that this may stimulate the posterior lobe of the pituitary gland. Our first results have been good.

CASE 1.—A primigravida, aged 23 (last menstruation Aug. 8, 1956), was admitted on May 6, 1957, at 6 A.M. The membranes had ruptured spontaneously half an hour earlier. She had had an uneventful pregnancy. A vaginal examination then revealed only 3 cm. (2 fingers) dilatation. She was put to bed without therapy. At 1.15 P.M. another vaginal examination was made and revealed exactly the same situation as at 6 A.M.; she felt no labour pains, and we could feel no uterine contractions. At 1.35 intravenous infusion of 1000 ml. of a 2·5% saline solution was begun and completed at 3·35. At 3 P.M. we felt the first weak uterine contraction. The labour pains became progressively more frequent and stronger, and at 7.55 a baby weighing 3080 g. (6·8 lb.) was born spontaneously.

CASE 2.—A primigravida, aged 33 (last menstruation July 26, 1956), was admitted on May 1, 1957, at 6.45 A.M. Labour pains had begun at midnight, after an uneventful pregnancy. At 10.30 A.M. a vaginal examination revealed 3 cm. (2 fingers) dilatation. There were only weak contractions of a short duration. At 4.45 P.M. a second vaginal examination revealed 4 cm. dilatation, and at 7.45 P.M. a third vaginal examination showed the same situation; practically no contractions could be felt. An intravenous infusion of 1000 ml. of a 2·5% saline solution was administered from 8·45 to 9.20 P.M. At 9 P.M. the contractions began again, and became stronger and more frequent. At 11.30, at full dilatation, the membranes were ruptured artificially, and at 12.25 A.M. a baby weighing 3060 g. (6·7 lb.) was born spontaneously.

CASE 3.—A primigravida, aged 29 (last menstruation July 3, 1956), was admitted on April 4, 1957. Pregnancy had been uneventful despite the fact that she had had serious diabetes mellitus since the age of 4 (88 units of insulin a day). On April 7 we concluded that the child was dead, for the fœtal heart sounds suddenly ceased. On April 11, and again on April 15, we tried unsuccessfully to induce labour by means of castor oil, quinine, and oxytocin. On April 17 she was discharged. At home she took stilbœstrol 20 mg. hourly for 10 hours. Since this also failed to bring about labour, she was again admitted on April 23. From 3.30 to 4.20 P.M. we gave an intravenous infusion of 1000 ml. of a 2·5% saline solution. At 4.30 P.M. we noticed the first contraction of the uterus, and these became progressively more frequent and stronger. At 1.00 A.M., at full dilatation, the membranes were ruptured artificially. At 1.32 a macerated female fœtus weighing 3620 g. (8 lb.) was born spontaneously.

All three mothers had a slight sensation of thirst after the infusion. During and after the infusion the blood-pressure and urine were regularly observed. We could find no proteinuria and only a slight rise in blood-pressure.

The injected hypertonic saline solution probably stimulated the neurohypophysis, so that the posterior lobe of the pituitary gland produced not only more antidiuretic hormone but also more oxytocic substance. This may afford a powerful and natural means of stimulating labour. We are now trying to work out a dosage scheme more thoroughly. The method is, of course, contra-indicated in hypertensive toxæmia and cardiac disease.

1. Verney, E. B. *Lancet*, 1946, ii, 739.
2. Verney, E. B. *Ibid*, 1948, ii, 108.

Department of Obstetrics and Gynæcology, State University, Utrecht, Holland.

T. L. A. DE BRUÏNE.

HIRSCHSPRUNG'S DISEASE

SIR,—I was very interested to read the remarks of Mr. Daintree Johnson and his colleagues (June 1) upon continence after abdomino-anal anastomosis. It has always appeared to me that normal bowel control is an involuntary process and does not depend upon voluntary contraction of the sphincters or of the levator ani muscle. Indeed, if what we are taught by physiologists is true, it is not possible to contract striated muscle for long periods.

Normal continence depends upon a normal sensory mechanism in the lower rectum and the involuntary internal sphincter. The latter thickened portion of the internal circular muscle of the bowel is the normal mechanism of continence. The voluntary external sphincter is only brought into play to prevent the short-lived sensation of the call to stool. It can contract voluntarily for about a minute allowing "plastic adaptation" to occur in the rectum and the internal sphincter time to regain control.

It is for this reason that abdomino-anal operations may give disappointing results. The reason why they may be successful is more difficult to understand.

London, W.1.

IAN P. TODD.

CARDIOGRAPHIC TECHNICIANS

SIR,—Your annotation of May 18 draws attention to the plight of radiographers. Cardiographic technicians are much fewer, but their financial position also needs emphasis.

In 1952 Mrs. X was a trained medical secretary when appointed technician in charge of a very busy department. In 1954 she was put on grade II of the cardiographic technicians' scale, £360 rising to £485 plus London weighting. By 1956 a small award had increased the scale to £390 rising to £520 p.a., plus London weighting. My medical secretary at the hospital, twelve years her junior, was then earning £12 a year more (and medical secretaries are by no means overpaid in the health service). In view of the obvious disparity between her salary and her value to the hospital, it was twice recommended to the Ministry of Health that Mrs. X should be given accelerated increments to her salary. These recommendations were both rejected. She would have preferred to continue in the hospital where she had worked for seventeen years, but she has recently accepted an appointment as medical secretary and cardiographer to an industrial firm, where her salary is £500 plus emoluments amounting to £39 per annum, and her promotion prospects are much better.

Under the N.H.S., a trained cardiographer (who needs to understand her patients as well as her machines) earns no more than many shorthand typists of 19 in industry.

While pressing our demands for increased remunerations for ourselves, it would be sad if, as a profession, we failed to press effectively for the improved pay of our technical assistants.

Central Middlesex Hospital, London, N.W.10.

KEITH BALL.

POSSIBLE CONTROL OF RADIOACTIVE-STRONTIUM DEPOSITION IN BONE

SIR,—The accumulation in bone of radioactive strontium from nuclear explosions raises the question of whether it is possible to restrict the absorption of strontium by the body or to eliminate what has already been absorbed.

The deposition of "calcium phosphate" in bone, in agreement with Robison's experiments,[1] can be interpreted in terms of the solubility-product principle, though not necessarily in terms of an initial deposition of trivalent phosphate. Since the physical chemistry of strontium and calcium is very similar, it is reasonable to expect that the mechanism of their deposition will be the same. It can also be reasonably assumed that strontium phosphate already deposited in bone—being, like calcium phosphate, "insoluble"—will be in a state of dynamic equilibrium with the surrounding tissues, in the same way as calcium phosphate. This concept may be used to try to restrict the deposition of radioactive strontium or to remove existing deposits in bone.

(1) Chemically, radioactive strontium and ordinary strontium are practically identical. Consequently, for the limited amount which can be carried by a *saturated* transporting enzyme system, the higher the ratio of the concentration of ordinary strontium to the concentration of radioactive strontium, in a given intake sufficient to saturate the transporting system, the smaller will be the quantity of radioactive strontium eventually deposited. Hence, addition of ordinary strontium salts to the diet, below toxic levels, should decrease the absorption of radioactive strontium, other factors being equal. Accurate data concerning human toxic limits, however, are apparently unavailable.

(2) For a limited and saturated phosphatase concentration—which may be expected to be responsible for the deposition of strontium in bone—the quantities of [Ca++] and [Sr ++] ord. + [Sr++] rad., by the solubility-product principle, must also be limited. Now, the higher [Ca++], the more likely is calcium-phosphate deposition and therefore the lower is the soluble-phosphate-ion concentration; this decreases the chances of strontium-phosphate precipitation. Hence, increase in the intake of calcium salts should decrease the uptake of both ordinary and radioactive strontium.

People drinking very hard water or taking calcium salts should therefore deposit less radioactive strontium in their bones. But absorption of calcium from the duodenum is dependent on pH (absorption takes place in slightly acid media, whereas in neutral or slightly alkaline conditions calcium phytate or phosphate may be precipitated). For this reason, people taking large doses of alkaline powders should be considered separately. In such circumstances increased calcium-salt absorption would require complex ions such as those found in the presence of citrates. The presence of precipitated calcium phosphate in the duodenum, however, may not be without advantage, as will be seen presently.

Some experiments I have performed suggest another approach. Strontium ions are removed from solutions containing strontium salts when the solutions come in contact with calcium or magnesium phosphate; and the action depends on surface area and duration of contact. The findings can be ascribed to initial adsorption followed by ion exchange and some precipitation of strontium phosphate. This raises the possibility of removing strontium isotopes from the gut on a large scale and therefore of considerably restricting their absorption, by adding calcium and magnesium phosphates to the diet.

Methods of control involving increased calcium absorption are particularly applicable to the young, who take up considerably more radioactive strontium than older people, because in this case high calcium absorption is well tolerated. When low calcium absorption is advisable, control may have to rely on gut precipitation and ion-exchange methods.

To remove existing deposits of radioactive strontium, other methods may be necessary. Those used for the removal of lead and other metals give a guide. Thus, lead deposited in bone can, by the injection of parathyroid hormone, be eluted and eventually excreted with bone calcium,[2] and it is likely that strontium elution will also follow. A less drastic method involves the use of sodium calciumedetate, which combines strongly with heavy metals.[3] Its administration leads to the formation of the lead salt, which is then excreted by the kidney.[4] Sodium calciumedetate may reasonably be expected to form the radioactive strontium analogue and thereby hasten removal of strontium. If so, the urine of persons treated in this way could be used to detect deposits of radioactive strontium in bone.

Further details and physical-biochemical considerations of the above and of the restriction of radioactive strontium transference in the food chain ending in man will be published elsewhere.

Physical Chemistry Laboratory,
South-West Essex Technical College,
London, E.17. S. LEWIN.

1. Robison, R. *Biochem. J.* 1923, **17**, 286.

HÆMOGLOBIN E IN A NEPALESE SOLDIER

SIR,—Hæmoglobin E has so far been found in Thais, Siamese, Indonesians, Veddas from Ceylon, Malaysians, Persians, and Philippinos. Recently [5] it was not found in 199 Nepalese Indian soldiers. In a study of the hæmoglobin types in Nepalese soldiers (Gurkhas) stationed in Malaya, one case has been found showing a combination of hæmoglobins A and E (hæmoglobin-E trait). On electrophoresis, using veronal buffer pH 8·8 by the evaporation-prevented technique,[6] the mobility was identical with that of an A and E sample supplied by Dr. Lie-Injo Luan Eng of the University of Indonesia. Since this finding was recorded a similar example has been observed.

The conclusion is warranted that hæmoglobin E does occur in Nepalese, but that its incidence is very low.

Department of Biochemistry,
University of Malaya,
Singapore. F. VELLA.

NEW WAYS WITH TAR OINTMENTS

SIR,—Tar ointments are still regarded as widely useful in dermatology but their disadvantages generally are that they are "messy," and that "elegant" and smooth preparations are difficult and expensive to make. Also tar ointments, because of the large and irregular tar particles, are frequently irritant.

Carney and Zopf [7] described their experiences using 0·5% polyoxyethylene sorbitan monolaurate ('Teen 20'), which is a non-ionic surfactant, to help "break up" the tar particles. He found that teen 20 (0·5%) and crude coal tar (1%) in zinc paste gave a very satisfactory ointment, in which the tar particles were uniformly small.

For the past two years we have used a similar substance, cetamacragol, in tar ointments, and found it very successful. With the aid of cetamacragol which is, I understand, widely used in cosmetic preparations, it is possible to break up the tar so that a very smooth and elegant preparation is obtained, and the tar can even be incorporated in ung. aquosum if necessary. These tar preparations are less messy to use than the ordinary ones, and spread more easily.

We have used two types of base for the tar: one very thick preparation in equal parts of Lassar's paste and 'Vaseline,' and a thinner one in ung. zinc et ol. ric.

2. Hunter, D. *Lancet*, 1930, i, 897, 947, 999.
3. Schwarzenbach, G., Ackermann, H. *Helv. chim. Acta.* 1948, **31**, 1029.
4. Sidbury, J. B. *Amer. J. Med.* 1955, **18**, 932.
5. Aksoy, M., Bird, G. W. G., Lehmann, H., Mourant, A. E., Thein, H., Wickremasinghe, R. L. *J. Physiol.* 1955, **130**, 56P.
6. Chernoff, A. I. *New Engl. J. Med.* 1955, **253**, 222.
7. Carney, R. G., Zopf, L. C. *Arch. Derm., Chicago*, 1955, **72**, 266.

Keining and Weber [8] have advocated the use of 'Nobecutane' sprayed on as a film after tar has been applied. We have recently tried this on patients with only a few fairly large plaques of psoriasis, and have found it very useful. It not only keeps the tar off the patient's clothes, but also stops the clothes from rubbing against the patches, and it often makes tar treatments acceptable when they would otherwise be refused.

We have found that nobecutane works well if applied over the Lassar's and vaseline but not over ung. zinc oxide, on which it does not dry. Care must be taken to apply the nobecutane thinly and from a distance of about one foot.

I would like to thank Dr. Alice Carleton for allowing me to treat the patients and Mr. W. Trillwood for making up the ointments.

The Radcliffe Infirmary, Oxford. SUZANNE ALEXANDER.

ACUTE SPONTANEOUS MEDIASTINAL EMPHYSEMA

SIR,—In your issue of March 9, Dr. Matts discusses five types of therapy for acute spontaneous mediastinal emphysema. A sixth which, I think, has merit when other techniques cannot be applied, is the inhalation of pure oxygen for a sufficient length of time to absorb nitrogen in the air dispersed through the mediastinal tissues.[9,10] This method was applied successfully to intestinal distension some 20 years ago, before the advent of the Miller-Abbott tube, and, in particular, for the absorption of the nitrogen in the air injected into the ventricles for encephalography. In the latter case, most of the injected nitrogen could be resorbed in three or four hours. Mention was then made of its possible application to mediastinal emphysema.

Boston, Mass. JACOB FINE.

CONSULTANT AND SPECIALIST

SIR,—In your leader of June 1 you stated that the consultant might get along well if relieved of some of his outpatients. As a general practitioner who held a senior-registrar post for four years, I have come to the conclusion that in a high proportion of cases the general practitioner could do without the outpatient department or the services of a consultant if he could have access to diagnostic facilities. The outpatient problem could thus be solved and result in an all-round saving in consultants. The general practitioner and the long-suffering patient would both benefit.

If the ability of the general practitioner received proper recognition and he was given better facilities for practice, more doctors might seek the comprehensive field of general practice and fewer the limited ground of the specialist, who generally sees only a part of every case. The whole standard of medical care might be improved and the cost of hospital care be greatly reduced.

Farnham Royal, Bucks. MARY HERFORD.

SIR,—I wish to condemn in the strongest possible terms the suggestion both in your leader and in the article headed "Reconstruction" (June 1) that a new grade of "specialist" of an assistant nature, with pay less than the consultant rate, should be introduced.

One of my main reasons for opposing this grade is your naïve and implicit faith in the Minister of Health. The fact that he would use the grade to obtain a cut-price consultant service you say is baseless. In your article under "Reconstruction" you state that the representatives of the profession have ensured that the S.H.M.O. appointments have not been misused. In both articles you show yourself unaware of, or are conveniently casting a blind eye at, the abuse of the S.H.M.O. grade. Anyone who cares to look into the question can find scores of people in this grade, with higher qualifications and adequate training, who are doing work of a consultant nature and without supervision. It is ludicrous to suggest that the Ministry has been honest in its use of the S.H.M.O. position. A cut-price consultant service is at present in existence and its further extension should be vigorously opposed.

The answer to the problem posed under "Reconstruction" is simple—the creation of more consultant posts. By all means have assistant physicians, surgeons, &c., but pay them as consultants, and then, as you remark with regard to such posts in the North West Metropolitan Regional Hospital Board, the holders will work contentedly.

CUT-PRICE CONSULTANT.

SIR,—At the inception of the National Health Service general physicians and surgeons wisely refused to accept the grade of senior hospital medical officer (S.H.M.O.) in their specialties. In your leader you recommend the introduction of such a grade under a new name without any reference to the problems and frustrations experienced by S.H.M.O.s.

Their status has suffered all along from inadequate definition embracing, as it does, both part-time general practitioner and full-time hospital specialist. Most full-time hospital specialists have entered the grade as a step in the training ladder via senior house-officer, registrar, and senior registrar. Although almost all full-time S.H.M.O.s are doing consultant work when they apply for consultant posts, the strongest candidates against them are teaching-hospital senior registrars, lecturers, and research men. In numerous instances the S.H.M.O. fails to get the appointment.

It is extremely doubtful if any significant number of full-time S.H.M.O.s working as assistants in a specialty would wish to remain in that state. Not all will want to become departmental heads, but that should not prevent their reaching consultant status.

Much of the present difficulty might be resolved if the S.H.M.O., after four or five years' service, were given the right to make application to his hospital staff committee for a review of his grading. This review should be carried out by a committee of the regional board and the hospital concerned. The undue preference for academic distinction now shown by appointments committees can there be tempered by personal knowledge of the applicant's work and effectiveness in his hospital.

For the future, consideration might be given to the suggestion that no-one be appointed consultant without having served as a S.H.M.O. for at least four years.

Peripheral hospitals can show that a 1 : 1 ratio of consultants to registrars is unnecessary and this should not be used as an argument against creating new consultants where needed.

The trained personnel to remedy the shortage of senior staff is available and with a little honesty all round the required establishment can be worked out.

S.H.M.O.

8. Keining, E., Weber, G. *Derm. Wschr.* 1956, **133**, 393.
9. Schwab, R., Fine, J., Mixter, W. J. *J. Amer. med. Ass.* 1937, **37**, 1271.
10. Fine, J., Hermanson, L., Frehling, S. *Ann. Surg.* 1937, **107**, 1.

Appointments

DRAWNEEK, WALDERMAN, M.B. Lond., D.P.H.: M.O.H., Redditch, Worcestershire.
PHILLIPS, C. H., M.R.C.S., D.P.H.: M.O.H., Bromsgrove, Worcestershire.

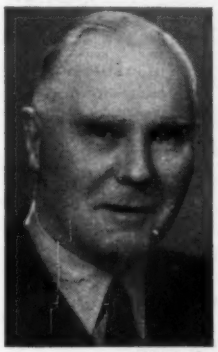
The Hospital for Sick Children, Great Ormond Street, London:
BUCK, MAVIS, M.B. Lond., D.A.: junior resident anæsthetist.
GARRETT, KATHARINE R., M.B. Lond.: house-physician.
GLOVER, W. J., M.B. Belf., F.F.A.R.C.S., D.OBST.: resident anæsthetic registrar.
KOHORN, E. I., M.B. Camb., D.OBST.: house-surgeon.
LEES, M. H., M.B. Lond., M.R.C.P.: house-physician.
MARTINS, A. G. Da S., L.M. Lisbon: house-surgeon.

Obituary

GEORGE FREDERICK BUCHAN
M.D. Glasg., F.R.C.P., D.P.H.

Dr. Buchan, whose death we announced last week, was medical officer of health for Willesden for thirty-five years. But this formal description of his career is misleading, for it gives no idea of the extent of his influence on public-health thought and practice both inside and beyond this country.

He was born at Kilmaurs, near Kilmarnock, in 1878 and graduated M.B. with distinction from the University of Glasgow in 1901. He at once decided to specialise in public health and the following year took the D.P.H. He served his apprenticeship in his specialty in junior appointments in Birmingham and at Heston and Isleworth, and when in 1912 he became medical officer of health for Willesden, though he was still young in years, he had a background of varied practical experience. In those days Willesden still had areas of pleasant pasture and there was a forge in Neasden Lane. The new M.O.H. toured his district in a horse-drawn carriage. The medical superintendent of the fever hospital visited his convalescent branch at Kingsbury on horseback. The ambulances and school-buses were still drawn by horses. The thirty-five years that Buchan spent at Willesden brought many changes. The care of physically defective children of the maternity and child-welfare services were his special concern and the subject of many far-seeing reports to his council. Willesden early offered immunisation against diphtheria to its school-children, home nurses to its invalids, health centres to its families, a maternity hospital to its mothers. Buchan was insistent that the agencies dealing with health and disease should be coördinated, and his success in implementing this principle drew visitors from all over the world to Willesden. He lost no opportunity to study work in other countries, and his peace-time visits to the United States and Canada led to his being asked by the Canadian Wartime Information Board to visit the Dominion to tell the people there about Britain's health in war-time. He was an honorary fellow of the Canadian and American public-health associations. It was characteristic of his concentration on the future that when he retired in 1947 he closed his own record of his work at Willesden with the words "Little remains to be written, but much has still to be done."



[Elliott & Fry

But though Willesden was his parish his work was not circumscribed by its limits. He lectured at Guy's Hospital, St. Mary's Hospital, and the London School of Hygiene. He took endless pains to arrange every detail of the programmes of the students sent to him at Willesden. He examined for the Universities of Bristol and London. He took a notable part in the revision of the curriculum for the D.P.H. in 1946. He was a member of the Commission on Vaccination which sat from 1926 to 1930, and he was a member of the B.M.A. planning committee which reported in 1942. The Royal College of Physicians made him a member in 1927, and in 1933 he was one of the first medical officers of health to be elected to the fellowship. For long he was also chairman of the council of the Royal Sanitary Institute, now the Royal Society for Health.

But his chief interest and perhaps the main channel of his influence was the Society of Medical Officers of Health. He became treasurer in 1919 and laid down this office to serve as president in 1925, only to resume it. Soon after the 1914–18 war he realised that, if the expanding public-health service was to attract the right type of entrants, the conditions and remuneration of its appointments must be reconsidered, and for the next ten years he was the tenacious and moving spirit of the campaign sustained by the Society and the British Medical Association which ultimately led in 1929 to the recognition of the Askwith scale. After Buchan retired from the treasurership of the Society in 1946 he continued to serve it as chairman of its council, and in 1947 he was elected to its honorary fellowship. Another task of his energetic retirement was the chairmanship of his local hospital management committee, and he conducted its business with his usual competence.

A. L. W., who for twenty years was associated with him in his maternity and child-welfare work at Willesden, writes:

Buchan was a great teacher and trainer of medical administrators. He drew a sharp line between administration and clinical medicine and did not expect his assistants to be expert clinicians nor his clinicians to dabble in administration. It was the duty of his assistant medical officers to seek out those that appeared to require expert attention and to bring them before the appropriate consultant who attended regularly at his clinics and to see that the consultant's advice was carried out. His medical officers were trained to be public-health experts responsible for an area and he never approved of dividing them into M. and C.W. officers, school medical officers, and so on. At this moment, the most important measure to reduce maternal mortality is considered to be improvement in the standard of antenatal care. Responsibility for seeing that a pregnant woman obeys instructions should rest on one person or clinic and the importance of following up defaulters is being stressed. George Buchan stressed this in 1931, and any pregnant woman who failed to keep an appointment was visited the same day to find out the reason.

Buchan was one of the clearest thinkers I have ever met. However leafy the trees, he saw nothing but the wood and not only steered a straight course through a problem but also convinced others without dominating them. He had no use for woolly thinking, yet he dealt with others whose brains were slower so gently that he rarely caused resentment.

W. J. recalls that Buchan began his career among the giants of the public-health service.

The two Hills, Bostock of Warwickshire and Eustace of County Durham, Robertson of Birmingham, Hope of Liverpool, Shirley Murphy of the London County Council, Newsholme of Brighton, and Newman of Finsbury, to mention only a few, were still in office. Young though he was he soon took his place among them and proved himself of equal stature. He held strong views regarding the status of the various kinds of health authorities and, indeed, of public-health administration generally; and he was in no doubt that an area such as Willesden, which he served with distinction for thirty-five years, was well able to look after its own affairs without any supervision from a county council. There was great competition among young people for appointments on his staff, and most foreign visitors studying British methods of public-health administration were directed to Willesden, where they found much to interest them. In particular, the Ministry of Health made frequent use of his services and many a tentative official scheme was discussed or given a trial in Willesden. He was a fluent speaker and a most determined advocate of any cause he had at heart. He and the late Charles Porter of Marylebone together with James Fenton of Kensington (happily still with us) were a most formidable trio—not that they always agreed, but if they did they usually carried all before them.

George Buchan was a striking figure—tall, always immaculately turned out, and a lover of the good things of life. He was a delightful and generous host. If he promised to do anything he always did it in the appointed time and to the very best of his ability. He was completely reliable. Many members of the public-health service all over the world, whom he had helped in one way or another, though they will mourn his death, will be proud to have known and worked with him. His elder brother, John Buchan of Bradford, no less outstanding a character, survives him.

Dr. Buchan leaves a widow and a daughter.

Births, Marriages, and Deaths

BIRTHS

SUDBURY.—On June 9, at Brentwood, to Mary (née Sadler), wife of Dr. J. R. Sudbury—a son.

DEATHS

FISHER.—On June 4, at the Memorial Hospital, Chipping Norton, Oxford, Donald Fisher, M.B.

Notes and News

MEDICINE AND LETTERS

A COLLECTION of essays lately published [1] is united by the belief that, in medical writing, clear thinking must precede simple, concise exposition. Dr. R. L. Cecil discusses the editing of a medical textbook, and makes the point that editorship, as well as authorship, is tending to become multiple. Plain words are called for by Dr. Morris Fishbein and Dr. Joseph Garland. Dr. Douglas Guthrie writes on medical history, and Dr. J. F. Fulton on bibliography. Dr. F. Marti-Ibanez gives an account of some famous men who combined the professions of medicine and letters. Some essays are instructive, others discursive; all will interest those who know (or need to know) how great is the need for lucidity, precision, and conciseness in medical writing.

NUTRITION OF URBAN CHILDREN

A JOINT committee on health policy of W.H.O. and UNICEF has reported that the health of city children in rapidly growing countries is often poor. The new populations have often crowded into fringe areas where sanitation is worse than in the villages. The mothers acquire a harmful modicum of sophistication which leads them to abandon traditional ways of caring for children though they cannot follow modern ways. In an Indian study infections and deficiency diseases were found to be commoner in urban than rural children.

University of Cambridge

Lord Adrian, O.M., has been elected vice-chancellor of the university for 1957-58.

On June 1 the following degrees were conferred:

M.D.—G. A. Gresham, M. C. Joseph, J. J. McMullan, David Scott.

M.B., B.Chir.—*C. U. Abengowe, *J. P. Clayton, *R. M. Pollock.

* By proxy.

University of London

Mr. M. J. H. Smith, PH.D., F.R.I.C., senior lecturer in chemical pathology at King's College Hospital Medical School, has been appointed to the university readership in chemical pathology at the school.

Lung Function in Respiratory Illness

A postgraduate course on this subject will be held at Sully Hospital, Penarth, Glam., from Sept. 9 to 13. Further particulars may be had from Dr. Harley Williams, Tuberculosis Educational Institute, Tavistock House North, Tavistock Square, London, W.C.1.

Conference on Adoption

The standing conference of Societies Registered for Adoption s to be held on Oct. 17 and 18 at the Church House, Dean's Yard, London, S.W.1. Further particulars may be had from the hon. secretary of the conference, Gort Lodge, Petersham, Surrey.

Ciba Foundation

The first of the foundation's lectures on research on ageing will be given by Dr. Nathan W. Shock, chief of the gerontology branch of the National Institutes of Health, Baltimore, on Tuesday, July 9, at 5 P.M., at the Zoological Society, Regent's Park, London, N.W.1. He will speak on age-changes in physiological functions in the total animal. Admission will be by ticket only, obtainable free from the assistant secretary of the foundation, 41, Portland Place, W.1.

College of Physicians and Surgeons of South Africa

In October this college will hold its first examinations for its fellowships in surgery, medicine, and obstetrics and gynæcology. The South African Medical and Dental Council have in principle recognised these fellowships as "additional qualifications." Their titles will be F.C.S. (S.A.), F.C.P. (S.A.), and F.C.O.G. (S.A.). The council has approved the inclusion in the college of a division of obstetrics and gynæcology, equal in standing with the divisions of surgery and medicine. It is intended to alter the title of the college to give effect to this change.

1. Medicine and Writing. Edited by Dr. F. MARTI-IBANEZ. M.D. International Symposia, no. 4. M.D. Publications Inc., 30, East 60 Street, New York 22, N.Y., U.S.A. New York. Pp. 65.

National Hospitals for Nervous Diseases

Sir John Woods has been appointed chairman of the board of governors of the National Hospitals for Nervous Diseases, London.

Poliomyelitis Vaccine for Malta

The minister of health for Malta has announced (*Times*, June 6) that the British Government has agreed to make poliomyelitis vaccine available for the island. Enough vaccine to vaccinate 5000 children has been received and the same amount will now be supplied monthly.

World Health Organisation

On June 15 a building erected by the Danish government in Copenhagen will be formally placed at the disposal of the World Health Organisation. The building will house the regional office for Europe, which has hitherto been housed in the Palais des Nations in Geneva.

Success of Campaign against Bovine Tuberculosis

Speaking at the Royal College of Veterinary Surgeons on June 5 (see *Times*, June 6) Mr. D. Heathcoat Amory, Minister of Agriculture, said that he hoped Britain would be free of bovine tuberculosis within five years. Already nearly two-thirds of the dairy herds in Britain were artificially inseminated and 90% of the population drank tuberculin-tested, pasteurised, or sterilised milk.

Diary of the Week

JUNE 16 TO 22

Monday, 17th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. William Evans: Pulmonary Heart-disease.

INSTITUTE OF OBSTETRICS AND GYNÆCOLOGY
3 P.M. (Queen Charlotte's Hospital, Goldhawk Road, W.6.) Prof. W. C. W. Nixon: Disordered Uterine Action.
4.30 P.M. Prof. James Walker: Fœtal Anoxia.

UNIVERSITY OF LIVERPOOL
5.15 P.M. Prof. Ernest Sachs (Washington University): Sir Victor Horsley—Pioneer of Neurosurgery.

Tuesday, 18th

INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. H. T. H. Wilson: Erythroderma.

Wednesday, 19th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
2.15 P.M. *Proctology.* Dr. Cuthbert Dukes, Mr. Lawrence Abel, Mr. W. B. Gabriel, Mr. O. V. Lloyd-Davies, Mr. C. N. Morgan: Major Surgery in Carcinoma of the Rectum with or without Colostomy excluding the Anal Canal and including the Rectosigmoid.

INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. R. V. Gibson: Pulmonary Heart-disease.

INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Arthur Tickner: Epidermal Proteins.

Thursday, 20th

INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
5.30 P.M. Prof. K. B. Corbin (Minnesota University): Analysis of 100 Cases of Protruded Cervical Discs with Compression of a Single Root.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1
7.30 P.M. Dr. A. J. Haddow: The Work of the Virus Research Institute at Entebbe.

HYPNOTHERAPY GROUP
8 P.M. (1, Wimpole Street, W.1.) Dr. George Newbold, Dr. Denys Kelsey, Dr. Gordon Davies, Dr. Gordon Ambrose: Brains Trust.

NUFFIELD ORTHOPÆDIC CENTRE, Wingfield-Morris Orthopædic Hospital, Oxford
8.30 P.M. Mr. H. Jackson Burrows: West Indian Orthopædics from the Touchline.

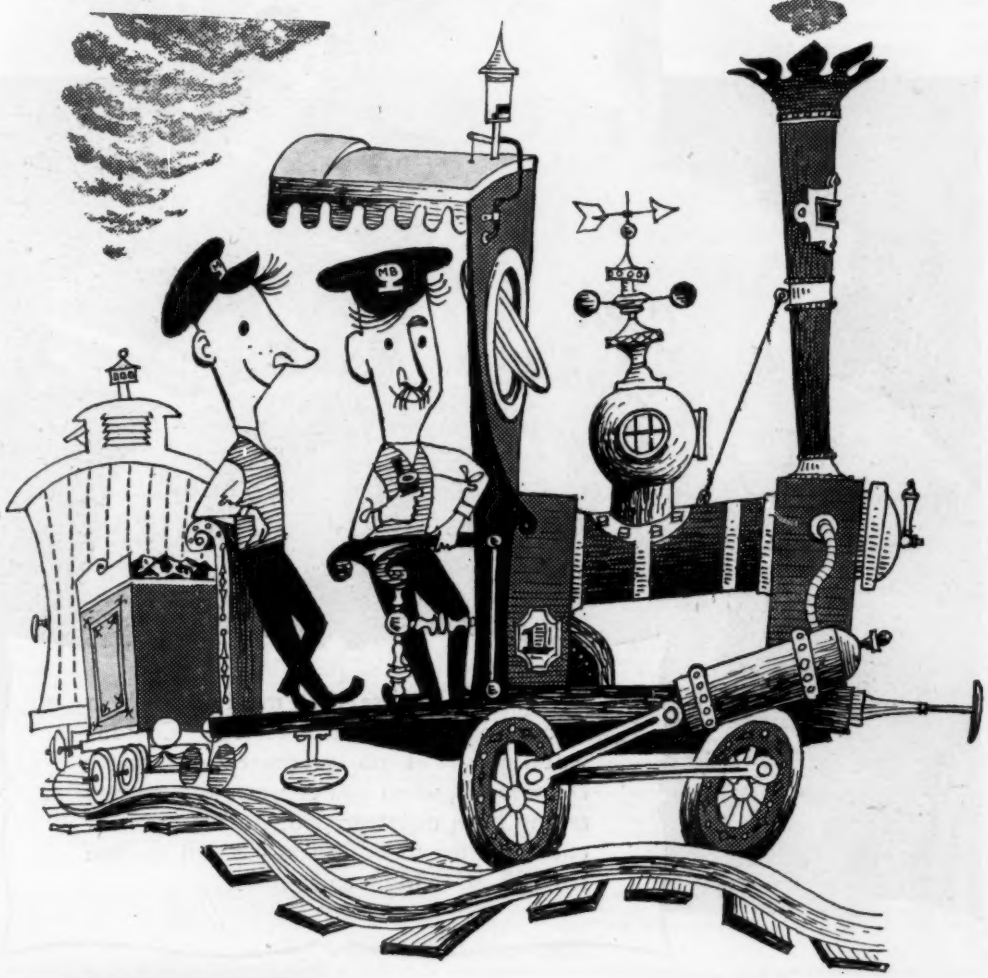
Friday, 21st

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. G. H. Macnab: Intestinal Obstruction in the Neonatal Period.
4 P.M. Dr. Malcolm Thompson: Principles and Practice in the Management of Rheumatoid Disease.

ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Sir Heneage Ogilvie: Shock.

FACULTY OF RADIOLOGISTS
11 A.M. (Royal College of Surgeons, Lincoln's Inn Fields, W.C.2.) *Diagnosis Section.* Dr. F. L. Ingram: Differential Diagnosis of Tumours of the Jaw. Dr. J. H. Middlemiss: Tropical Radiology.
Therapy Section. Discussion on Genetic Leukæmogenic Hazards of Radiotherapy.
4.30 P.M. Sir Arthur Porritt: Surgery or Science in Breast Cancer. (Skinner lecture.)

Locomotion with no commotion



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Academic and Educational

THE UNIVERSITY OF BIRMINGHAM
FACULTY OF MEDICINE

COURSE OF INSTRUCTION FOR PART II OF THE DIPLOMA IN PSYCHOLOGICAL MEDICINE OF THE CONJOINT BOARD

A PART-TIME COURSE of instruction for Part II of the Diploma in Psychological Medicine of the Conjoint Board will commence in OCTOBER, 1957, and extend over the following academic year. The fee for the whole course will be 45 guineas. A detailed syllabus will be forwarded on request.

Those wishing to attend the course should apply to the Chairman, Board of Graduate Studies, The Medical School, Edgbaston, Birmingham, 15, not later than 10th September, 1957.

UNIVERSITY OF MANCHESTER
FACULTY OF MEDICINE

DIPLOMA IN PSYCHOLOGICAL MEDICINE

A COURSE in preparation for the Diploma in Psychological Medicine will commence in OCTOBER, 1957, subject to a sufficient number of candidates being available. The instruction is part-time covering 3 half-days per week for 3 terms.

Further particulars as to admission and fees may be obtained from the Dean of Postgraduate Medical Studies, The University, Manchester, 13, to whom applications for entry to the course should be made not later than Monday, 1st July.

FACULTY OF ANÆSTHETISTS

PROGRAMME OF A SCIENTIFIC MEETING

to be held at The Royal College of Surgeons of England, Lincoln's Inn-fields, London, W.C.2, ON SATURDAY, 15TH JUNE, 1957.

10.30 A.M. . . Neonatal Respiration and Hyaline Membrane by Prof. IAN DONALD, M.B.E., F.R.C.O.G.
11.30 A.M. . . Coffee.
12 NOON . . Hypo- and afibrinogenæmia by Dr. H. F. BREWER, M.D., B.CH. (Camb).
12.15 P.M. . . The Action of Anæsthetics on the Uterus by Prof. W. C. W. NIXON, F.R.C.O.G.
1.00 P.M. . . Lunch.
2.15 P.M. . . The Clinical Implications of the Toxæmias of Pregnancy by Prof. A. S. DUNCAN, D.S.C., F.R.C.O.G.
3.15 P.M. . . Retrolental Fibroplasia by Mr. C. A. G. COOK, M.C., G.M., F.R.C.S.
3.30 P.M. . . Tea.
4.00 P.M. . . Aspiration by Dr. C. F. SCURR, M.V.O., F.F.A.R.C.S.

No charge will be made for attending the Meeting beyond a nominal fee of 10s. to cover the cost of morning coffee, a buffet lunch and afternoon tea.

All Fellows and Members of the Faculty are cordially invited to attend and may if they wish, bring medical guests.

THE MILROY LECTURES ON STATE MEDICINE AND PUBLIC HEALTH

The Council of the Royal College of Physicians of London are prepared to receive applications for the office of MILROY LECTURER for 1959.

Applications must be addressed to the Registrar, Royal College of Physicians, Pall Mall East, S.W.1, to reach the College on or before WEDNESDAY, 11TH SEPTEMBER, 1957, and to include a short synopsis of the subject selected by the candidate.

2 Lectures are to be given on a TUESDAY and THURSDAY in FEBRUARY, or MARCH, 1959.

A copy of Dr. Milroy's "Suggestions" on the subject of his bequest, and information as to the emolument, may be obtained from the Registrar.

THE ROYAL SOCIETY

GOVERNMENT GRANT FOR SCIENTIFIC INVESTIGATIONS

Applications for grants from the second allotment of the Government Grant for Scientific Investigations for the year 1957 should be made as soon as possible on forms of application to be obtained from the Assistant Secretary of the Royal Society, Burlington House, London, W.1. No application can be considered which is received later than 31st July, 1957.

Applicants must be of British nationality, resident in Great Britain or Northern Ireland. Grants may be made for purposes in connection with the promotion and support of research in pure science other than for personal maintenance or payment of stipends; for the assistance of scientific expeditions and collections; but not in aid of scientific publications.

UNIVERSITY OF LONDON (British Postgraduate Medical Federation). INSTITUTE OF NEUROLOGY (Queen-square). Applications are invited from registered medical practitioners for the post of LECTURER IN CLINICAL NEUROLOGY in the Academic Unit. The salary scale is at present under review, and is expected to be within the range £1150–£100–£1650 p.a. with superannuation benefits and family allowances.

Applications should be sent not later than 6th July, 1957, to the Secretary, Institute of Neurology (Queen-square), The National Hospital, Queen-square, London, W.C.1, from whom further particulars may be obtained.

THE UNIVERSITY OF MANCHESTER. Applications are invited from science graduates for the post of ASSISTANT LECTURER in the Department of Bacteriology in the Faculties of Science and Medicine. Some experience in biochemistry would be considered an advantage. The successful applicant would partake in the teaching of science students and undertake research in the section of bacterial chemistry. The salary scale is at present under review, and is expected to be within the range £700–£850 p.a. Membership of F.S.S.U. and Children's Allowance Scheme.

Applications should be sent not later than 24th June, 1957, to the Registrar, the University, Manchester, 13, from whom further particulars and forms of application may be obtained.

UNIVERSITY OF ST. ANDREWS. Queen's College, DUNDEE. DEPARTMENT OF MIDWIFERY AND GYNÆCOLOGY. The University Court of the University of St. Andrews invites applications for the post of LECTURER IN MIDWIFERY in the Department of Midwifery and Gynæcology, Queen's College, Dundee, commencing 1st October, 1957. The person appointed will receive an honorary appointment from the Eastern Regional Hospital Board as Clinical Assistant; M.R.C.O.G. essential; research training an advantage. Present salary scale, £1300–£1600, but a revised scale will operate from date of appointment. F.S.S.U. benefits and family allowance; a grant towards expense of removal may be made.

Further particulars of the appointment may be obtained from the undersigned, with whom 8 copies of the application, containing the names of 3 referees, should be lodged not later than 6th July, 1957.

PATRICK CUMMING, Joint Clerk to the University Court.
Queen's College, Dundee, June, 1957.

THE UNIVERSITY OF LIVERPOOL. Department of STUDIES IN PSYCHOLOGICAL MEDICINE. Applications are invited for the post of RESEARCH ASSISTANT IN PSYCHOLOGICAL MEDICINE at a salary within the range £1000–£1200 p.a., according to qualifications and experience. The appointment will be tenable for 1 year and may be renewed for a second year.

Applications, stating age, academic qualifications and experience, together with proposed subjects of research and the names of 3 referees, should be received not later than 29th June, 1957, by the Registrar, from whom further particulars of the conditions of appointment may be obtained.

THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE. Applications are invited for the post of LECTURER in the School in some branch of Tropical Medicine including experimental medicine, clinical medicine, parasitology, entomology or hygiene. The Lecturer will be a member of the home establishment, but will be expected to serve in the tropics in a selected station or in a University or similar institution. The appointment will be made for 5 years in the first instance. The salary will be within the range of that for Lecturer Grade II (clinical) with F.S.S.U. allowances, the starting point being determined by qualifications and experience. Applicants must be medically qualified and should have had previous experience in their chosen field. Experience in the tropics is desirable but not essential. The successful applicant will be expected to take up his duties as early as possible during the session commencing October, 1957.

Applications, including the names of 2 referees, should be forwarded to the Administrative Secretary, Liverpool School of Tropical Medicine, Pembroke-place, Liverpool, 3, by 31st August, 1957. Further details may be obtained from the Administrative Secretary.

UNIVERSITY COLLEGE, Ibadan, Nigeria. Applications are invited for following posts in Clinical Departments.

Anæsthesia: LECTURER.
Bacteriology: SENIOR LECTURER or LECTURER.
Preventive and Social Medicine: SENIOR LECTURER or LECTURER.

Appointments from October, 1957, for 3 years initially. Successful candidates would be offered Honorary Consultant appointments by Board of Management of University College Hospital. Salary scales: Senior Lecturer £1850–£100–£2450 p.a.; Lecturer £1700–£100–£2100 p.a. Allowance for up to 3 children, £50 p.a. per child resident in Nigeria, £100 p.a. per child resident elsewhere. Part furnished accommodation at rent not exceeding 7·7% of salary. Passages for member of staff, wife, and up to 3 children below 11 years on appointment, overseas leave and termination. F.S.S.U. Outfit allowance £60.

Detailed applications (10 copies), naming 3 referees, by 15th July, 1957, to Secretary, Senate Committee on Colleges Overseas in Special Relation, University of London, Senate House, London, W.C.1, from whom further particulars may be obtained.

Hospital Services: Senior Appointments

FRENCH HOSPITAL AND DISPENSARY, 172, Shaftesbury-avenue, W.C.2. Applications are invited for the post of HONORARY PHYSICIAN to Outpatients with charge of beds. Candidates must have an M.D. and be Members or Fellows of the Royal College of Physicians. A good knowledge of French is essential.

Applications should be sent to the Secretary of the Hospital, giving the usual references, on or before 15th July, 1957.

THE LONDON CLINIC. (164 Beds.) Applications are invited for the full-time post of DEPUTY DIRECTOR of the Department of Clinical Pathology. Applicants must be registered medical practitioners with wide experience in pathology. The successful candidate will be required to join a contributory superannuation scheme if not already a member. The commencing salary will depend on qualifications and experience but will be not less than £2750 p.a. with opportunity for advancement.

Applications, stating age, qualifications, experience, and details of past appointments together with names of 3 referees, should be forwarded to the House Governor, London Clinic, Devonshire-place, London, W.1.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. BRIGHTON AND LEWES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for a Full-time or Part-time Locum RADIOTHERAPIST (Consultant, Senior Registrar or Registrar) at the above Hospital for a period of about 3 months commencing immediately.

Further information can be obtained from the Group Secretary, Brighton and Lewes Hospital Management Committee, Royal Sussex County Hospital, Eastern-road, Brighton (Tel. No. Brighton 29155), to whom applications for the post should be sent immediately.

BIRMINGHAM REGIONAL HOSPITAL BOARD. COVENTRY GROUP OF HOSPITALS. Whole-time SENIOR CASUALTY OFFICER (Senior Hospital Medical Officer scale) to have clinical charge of Casualty Department, Manor Hospital, Nuneaton. Tenable up to 4 years. Higher qualification advantageous. Self-contained flat available.

Applications (15 copies), stating name, age, nationality, present and previous appointments and details of 3 referees, to Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, by 15th July, 1957.

CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL. Required, experienced Locum Tenens SENIOR HOSPITAL MEDICAL OFFICER for long period, full residence or only when on duty. Unit has 312 Beds for the treatment of pulmonary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery, chest clinics, and mass radiography.

Apply Physician-Superintendent.

EAST ANGLIAN REGIONAL HOSPITAL BOARD. CONSULTANT OPHTHALMIC SURGEON (8 notional half-days), Norfolk and Norwich Hospital Group. Main hospital Norfolk and Norwich (441 Beds).- Wide experience and higher qualification essential.

Applications (8 copies), stating age, experience and names of 3 referees, to the Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 24th June, 1957. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Norfolk and Norwich Hospital.

LEEDS REGIONAL HOSPITAL BOARD. Whole-time Locum RADIOLOGIST (Consultant or Senior Hospital Medical Officer). Duties mainly at Scarborough Group of hospitals. The appointment would be for an initial period of 3 months subject to further extension.

Applications, stating age, qualifications, and details of appointments held showing dates, together with the names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, as soon as possible.

LEEDS REGIONAL HOSPITAL BOARD.

Part-time CONSULTANT in Obstetrics and Gynæcology (7 notional half-days per week) for duties at hospitals in the East Riding of Yorkshire (mainly at Beverley and Driffield). The person appointed to reside in Beverley.

Maximum Part-time CONSULTANT in Radiology for duties at hospitals in Scarborough, Bridlington, and Malton. The person appointed to reside in Scarborough.

Whole-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer scale) for duties at Clifton Hospital, York (1112 Beds), and associated clinics at Harrogate, York, and Scarborough. The person appointed may also have duties at Claypenny Hospital for Mental Defectives (1 session per week). Small flat available.

Applications (12 copies), stating age, qualifications, and details of present and previous appointments with dates, and names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, by 9th August. 1957.

LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for the post of Whole-time ASSISTANT ANÆSTHETIST (Senior Hospital Medical Officer) with duties in the North Liverpool, Liverpool and District Eastern and Liverpool Region Children's Groups. Candidates should have considerable experience in anæsthesia and should be Fellows of the Faculty of Anæsthetists.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 6th July, 1957.

VINCENT COLLINGE, Secretary to the Board.

AMENDED ADVERTISEMENT

LIVERPOOL REGIONAL HOSPITAL BOARD. The UNITED LIVERPOOL HOSPITALS. Applications are invited for the post of CONSULTANT ANÆSTHETIST (whole-time or maximum part-time sessions) giving 2 sessions to The United Liverpool Hospitals (initially at St. Paul's Eye and Stanley Hospitals, Liverpool), with the remainder of the sessions mainly in the North Liverpool area. Candidates must have had at least 5 years recognised training and experience in anæsthesia and must be Fellows of the Faculty of Anæsthetists.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 6th July, 1957.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL REGIONAL HOSPITAL BOARD. Sefton GENERAL HOSPITAL. (995 Beds.) Applications are invited for the post of Whole-time CONSULTANT PHYSICIAN-SUPERINTENDENT (non-resident) to the above Hospital. The post is mainly clinical with a small proportion of time devoted to medical administration and the salary will be at the Consultant level in accordance with the terms and conditions of service of hospital medical and dental staffs.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 6th July, 1957.

VINCENT COLLINGE, Secretary to the Board.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for appointment as CONSULTANT ANÆSTHETIST for 2 sessions a week. The initial duties of the post are for 2 gynæcological operating sessions at Liverpool Royal Infirmary. Candidates should possess a registrable qualification and F.F.A.R.C.S.

Apply by 6th July, 1957, giving full particulars of age, qualifications, experience, &c., and details of present and previous appointments, together with the names of 3 referees, to the Secretary, 80, Rodney-street, Liverpool, 1.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. Locum Tenens ANÆSTHETIST (Senior Hospital Medical Officer) required 11th–20th July, inclusive. Post is resident and full-time.

Apply to the Hospital Secretary at once.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time Locum ANÆSTHETIST (Senior Hospital Medical Officer) required for the Rochdale Group of hospitals. Resident or non-resident. Salary £34 14s. 6d. per week.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale.

MANCHESTER REGIONAL HOSPITAL BOARD. Whole-time CONSULTANT PATHOLOGIST to Booth Hall (Children's) and Monsall Hospitals, Manchester. Special experience of pathology of children essential and in morbid anatomy and biochemistry desirable.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 24th June, 1957.

NEWCASTLE REGIONAL HOSPITAL BOARD. Locum CONSULTANT E.N.T. SURGEON (whole-time, or maximum part-time for 9 notional half-days per week) required immediately for North West Durham and Durham Groups of hospitals —main hospitals Shotley Bridge General (533 Beds), Dryburn, Durham (303 Beds). Appointment for approximately 3 months.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road. Newcastle upon Tyne, 6, immediately.

NORTH WEST METROPOLITAN REGIONAL HOS-PITAL BOARD. ASSISTANT CHILD PSYCHIATRIST (Senior Hospital Medical Officer grade), 2 half-days a week (1 day), Hertfordshire Child Guidance Service. Candidates may visit by appointment with the Medical Director, Child Guidance Clinic, Hill End, St. Albans.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, before 22nd July, 1957.

OXFORD REGIONAL HOSPITAL BOARD. Locum CONSULTANT RADIOLOGIST required 24th June–19th July at Aylesbury and Stoke Mandeville Hospitals, 4 sessions per week.

Applications, stating qualifications, experience and names of 2 referees, to Secretary, 43, Banbury-road, Oxford.

SHEFFIELD REGIONAL HOSPITAL BOARD. Con-SULTANT GENERAL SURGEON (maximum part-time) required for hospitals in the Boston Area.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 13th July, 1957.

ST. HELENS. PROVIDENCE HOSPITAL. Applications invited for the post of HONORARY ASSISTANT CONSULTANT RADIOLOGIST at above Hospital. The Hospital has 125 Beds and an Outpatients Department and the appointment will be for 2 notional half-days per week.

Applications, giving full details of qualifications and experience and names and addresses of 2 referees, should be forwarded to undersigned not later than 29th June, 1957.

WILLIAM J. LIVESEY, Honorary Secretary.

Providence Hospital, St. Helens.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Ophthalmology. PERTH AREA. Applications are invited for the post of ASSISTANT OPHTHALMOLOGIST in the area covered by the County and City of Perth General Hospitals Group (main hospitals—Perth Royal Infirmary, 272 Beds, and Bridge of Earn Hospital, 806 Beds), including Local Authority Clinics in Perth and Perthshire. The appointment will be on a whole-time or maximum part-time basis in the option of the successful candidate. Salary (whole-time) £1653 15s.–£52 10s – £2126 5s. p.a.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 13th July, 1957.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD.—Applications are invited for the following appointments :—

ASSISTANT ANÆSTHETIST based at the Royal Infirmary, Glasgow.

ASSISTANT ANÆSTHETIST based at the Vale of Leven Hospital, Alexandria, Dunbartonshire.

These appointments will be whole-time or on the maximum part-time basis of 9 sessions per week. Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

2 Whole-time ASSISTANT PHYSICIANS in Geriatrics based at Foresthall Hospital, Glasgow.

Whole-time SENIOR HOSPITAL MEDICAL OFFICER in Geriatrics at Coathill Hospital, Coatbridge, and at Hairmyres Hospital, East Kilbride.

Salary (at age 32 and over) on the scale £1653 15s.–£52 10s.–£2126 5s.

Applications (16 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board, 64, West Regent-street, Glasgow, C.2, not later than 30 days after the publication of this advertisement.

SCOTLAND. NORTH-EASTERN REGIONAL HOS-PITAL BOARD. SENIOR HOSPITAL MEDICAL OFFICER in Ophthalmology (whole- or maximum part-time appointment), Aberdeen General Hospitals. Candidates should have extensive experience in ophthalmology and preferably should hold an appropriate higher qualification.

Applications, giving the names of 2 referees, should be submitted by 22nd June, 1957, to the Secretary, North-Eastern Regional Hospital Board, Scotland, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Locum Tenens CONSULTANT SURGEON (whole-time) for duty in the Dunfermline and West Fife Hospital for the month of July.

Apply, giving qualifications and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 22nd June.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT (general medicine) required Newport and East Mon. and North Mon. Hospital Management Committee areas immediately.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

WELSH REGIONAL HOSPITAL BOARD. Whole-time Locum Tenens CONSULTANT (general medicine) required Merthyr and Aberdare Hospital Management Committee area, 3rd–24th August, 1957.

Applications, naming 2 referees, to Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff.

AUSTRALIA. MILDURA BASE HOSPITAL, Victoria, AUSTRALIA. Applications are invited from Medical Officers qualified to accept an appointment as MEDICAL SUPERINTENDENT of this Hospital. Applicants to state age, marital status, war service (if any), previous experience, present position and forward copies of recent references. Daily average number of inpatients 150, medical, surgical, obstetric, infectious and tuberculosis. Number of beds available 217, and a programme of expansion provides for an additional 35 beds. 1 Senior and 2 Junior Resident Medical Officers, plus the Medical Superintendent comprise the present establishment. Salary range £1767 12s.–£2367 12s. (Australian) according to qualifications and experience. The appointee may be allotted a specific number of public beds. Comfortable 3-bedroom brick home available at a reasonable rental.

Please contact the undersigned for further particulars if required. H. ROGERS, Manager/Secretary.

U.S.A. VIRGINIA. Applications are invited for the following appointments :—

(*a*) MENTAL HOSPITAL CHIEF OF SERVICE. Salary $10,992–$12,528 (£3925–£4474). Minimum qualification is 4 years of psychiatric experience including 2 years of mental hospital psychiatry. The appointee will be responsible for the overall supervision of either the men's or women's psychiatric division of the Hospital and should be interested in assisting with the training of Junior Physicians. A higher qualification is desirable.

(*b*) MENTAL HOSPITAL STAFF PHYSICIANS. Salary $10,032–$11,472 (£3583–£4097). Applicants must have at least 2 years of psychiatric experience and be experienced in modern methods of treatment. The duties will principally be concerned with patient care but the Staff Physicians are expected to assist in the supervision of the Junior Physicians.

(*c*) MENTAL HOSPITAL JUNIOR PHYSICIANS. Salary $8400–$9168 (£3000–£3274). These appointments are approved by the American Medical Association for 2 years training in psychiatry. The Junior Physicians work under the supervision of the senior staff members and are required to attend all training sessions as planned by the Director of Training and Research.

Eastern State Hospital is a 2100-Bed mental hospital operated by the Commonwealth of Virginia. It is situated in historic Colonial Williamsburg, is within easy reach of Richmond, Virginia, and Washington, D.C. Mentally ill patients of the white race are accepted for treatment. Mental defectives and epileptics are not eligible for admission unless their illness is complicated by psychosis.

Applicants should send full details of their training and experience together with the names and addresses of 3 referees to the undersigned by air-mail. Suitable applicants may be interviewed in London between 18th and 21st July.

JOSEPH E. BARRETT, M.D., Superintendent.
Eastern State Hospital, Williamsburg, Virginia, U.S.A.

WESTERN AUSTRALIA. ROYAL PERTH HOSPITAL. Applications are invited for the full-time post of STAFF RADIOLOGIST in Diagnostic Radiology. Candidates must be fully qualified Radiologists and preference will be given to those with higher qualifications. Salary £A3120 p.a.

The Royal Perth Hospital is a Medical Undergraduate Teaching Hospital ; it has more than 600 Beds and is extending.

The Senior Staff Radiologist and the Staff Radiologist will work under the overall direction of the Director of Radiology who will be a senior member of the Honorary Staff.

The Staff Radiologist will assist in the internal management of the department ; training of technicians ; arrangement of demonstrations and provision of radiological teaching material.

A memorandum of further particulars concerning this post will be supplied on request.

The selected applicant will be required to furnish a satisfactory medical certificate and a clear chest X-ray.

In addition to all relevant details, applications must include particulars of qualifications, experience, the names of 2 referees, and should reach the undersigned on or before 30th September, 1957. JOSEPH GRIFFITH, Administrator.

CANADA. REGINA GREY NUNS' HOSPITAL, Regina, SASKATCHEWAN. Applications are invited for the post of ASSISTANT PATHOLOGIST in general hospital (530 Beds) containing South Saskatchewan Cancer Clinic. Salary $12,000 rising to $15,000. All-round training in pathology with good experience in morbid anatomy and special interest in haematology or bacteriology.

Inquiries as soon as possible to—
Dr. J. W. WHITTICK, Director of Pathology.

Hospital Services : Junior Appointments

ACTON HOSPITAL, Gunnersbury-lane, W.3. Senior HOUSE OFFICER (casualty) required for 1 year from 28th June, 1957. Resident post.

Applications to Hospital Secretary within 7 days.

ALBERT DOCK ORTHOPÆDIC AND FRACTURE HOSPITAL, Alnwick-road, E.16. SEAMEN'S HOSPITALS GROUP. SENIOR HOUSE OFFICER (surgery) required on or about 1st July. Post, which is normally resident, is recognised by the Royal College of Surgeons, and provides excellent experience in a wide variety of traumatic conditions received from the adjacent dockland and from shipping in the Port of London. Salary £819 10s.

Applications, stating age, nationality, qualifications, and experience with the names of 2 recent referees, should be sent to the Secretary, Dreadnought Seamen's Hospital, Greenwich, not later than 22nd June.

BETHNAL GREEN HOSPITAL, Cambridge Heath-road, E.2. HOUSE SURGEON (pre-registration post) required, vacancy 4th July.

Applications, stating experience and copies of 2 testimonials, to Hospital Secretary.

CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10. RESIDENT HOUSE OFFICER required in General Medical Department, including haematology and endocrinology. Pre-registration appointment from 1st August, 1957.

Applications, with 2 testimonials, to Medical Director by 22nd June, 1957.

CHILDREN'S HOSPITAL, Sydenham, S.E.26. House OFFICER (medicine and surgery) required 1st September. Recognised for D.C.H.

Apply, naming 2 referees, to Administrative Officer by 22nd June.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of CASUALTY OFFICER AND DEPUTY RESIDENT SURGICAL OFFICER graded as Senior House Officer. Recognised for F.R.C.S. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road, E.11.

CONNAUGHT HOSPITAL, Walthamstow, E.17. (118 Beds.) Applications are invited for the post of SECOND CASUALTY OFFICER with duties in the Department of Orthopædic and Traumatic Surgery (Senior House Officer grade). Recognised for F.R.C.S. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Hospital Management Committee, Forest Group, Langthorne-road E.11.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-months resident appointment of pre-registration HOUSE PHYSICIAN (vacant 18th July), should reach the Secretary, above address, by 24th June, quoting HH/PHP.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications for the 6-months resident appointment of pre-registration HOUSE SURGEON (vacant 16th July—recognised for F.R.C.S.) should reach the Secretary, above address, by 24th June, quoting HH/PHS.

HACKNEY HOSPITAL, London, E.9. (General—841 Beds.) Applications are invited for the following 6-months resident appointments :—

(*a*) Registered OBSTETRIC HOUSE SURGEON, from 17th October.

(*b*) Pre-registration OBSTETRIC HOUSE SURGEON (second post) from 18th July.

Posts recognised for M.R.C.O.G.

Applications to Secretary, above address by 24th June, quoting HH/H50(*a*) or (*b*).

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time RESIDENT REGISTRAR (thoracic surgery) required as soon as possible.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 24th June.

HAMMERSMITH HOSPITAL AND POSTGRADUATE MEDICAL SCHOOL AND NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Joint appointment. Whole-time REGISTRAR (orthopædics) required as soon as possible. Appointment tenable for 2 years, of which 1 will be spent at Hammersmith Hospital and the Postgraduate Medical School of London studying orthopædic and traumatic surgery and 1 year (resident if required) at Heatherwood Hospital, Ascot, studying long-term orthopædic surgery.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, Ducane-road, London, W.12, by 24th June.

HIGHLANDS GENERAL HOSPITAL, Winchmore Hill, N.21. ANÆSTHETIST, vacant 6th July, 1957 (Senior House Officer grade), resident. 100 active surgical and orthopædic beds, approximately 1200 operations annually.

Applications, with copies of 3 testimonials and name and address of 1 referee, to Hospital Secretary.

LONDON HOSPITAL, Whitechapel, E.1. Applications are invited for the post of REGISTRAR to the Radiotherapy Department. Candidates should either have passed Part I of the D.M.R. or possess a higher medical qualification.

Applications (12 copies), giving the names and addresses of 3 referees, should be received by the undersigned by 25th June.

H. BRIERLEY, House Governor.

METROPOLITAN EAR, NOSE, AND THROAT HOSPITAL at St. Mary Abbot's Hospital, Marloes-road, Kensington, W.8. E.N.T. REGISTRAR, vacant immediately. Candidates should have had considerable E.N.T. experience and possess the F.R.C.S. or D.L.O. Candidates may visit the Hospital by arrangement.

Applications (5 copies) to be submitted by 28th June, 1957, on forms obtainable from, and returnable to, Group Secretary (L.44), Fulham and Kensington Hospital Management Committee, 5, Collingham-gardens, London, S.W.5.

LAMBETH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners (Women) for the post of SENIOR HOUSE OFFICER in Anæsthetics based on the South London Hospital for Women.

Application forms from the Secretary, South London Hospital for Women, Clapham Common, S.W.4.

LAMBETH HOSPITAL, Brook-drive, S.E.11. Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE SURGEON, vacant on 23rd July, 1957. The successful candidate will be required to carry out a fortnight's Locum duty commencing 9th July, 1957. Recognised for the F.R.C.S.

Application forms from the acting Physician-Superintendent.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE PHYSICIAN AND CASUALTY OFFICER, vacant on 15th July, 1957. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

MILDMAY MISSION HOSPITAL, Austin-street, London, E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE SURGEON (post recognised for F.R.C.S.), vacant on 15th July, 1957. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

MOTHERS' HOSPITAL (Salvation Army), Clapton, E.5. (Maternity—110 Beds.) Applications are invited for the following 6 months resident posts :—

(*a*) Registered OBSTETRIC HOUSE SURGEONS (2 posts, vacant 1st August and 1st September).

(*b*) Pre-registration (second post) OBSTETRIC HOUSE SURGEON, vacant 1st September.

Posts recognised for M.R.C.O.G.

Apply Group Secretary, Hackney Hospital, London, E.9, by 24th June, quoting MH(*a*) or (*b*).

NATIONAL HOSPITALS FOR NERVOUS DISEASES. HOUSE OFFICER (resident), medical or surgical, to the Neurosurgical Department at the Maida Vale Hospital for Nervous Diseases, London, W.9. Appointment in the first instance for 6 months. Grading as Senior House Officer or Registrar according to experience.

Applications, with copies of 3 recent testimonials, should be sent to the Secretary, Maida Vale Hospital, W.9, not later than 21st June, 1957.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. 2 OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEONS (resident) required for 1st August.

(*a*) Registered medical practitioner.

(*b*) Pre-registration candidate (second post).

Both posts recognised by R.C.O.G. for Diploma, and as a combined post for Membership. Candidates must have held house appointments in either medicine or surgery. Large Obstetric and Gynæcological Department.

Applications (in own handwriting), stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 25th June.

NORTH MIDDLESEX HOSPITAL, Edmonton, N.18. RESIDENT HOUSE SURGEON (general surgery), pre- or post-registration, required for 6 months. Post recognised for F.R.C.S. Vacant 1st August.

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials, to Secretary of Hospital, by 3rd July.

PLAISTOW HOSPITAL, Samson-street, London, E.13. Applications are invited for appointment of SENIOR HOUSE OFFICER (resident) to the Chest Unit and Infectious Diseases Unit at the above Hospital for 12 months commencing early July, 1957. Previous experience in diseases of the chest is desirable ; excellent experience is afforded in the investigation of chest and infectious diseases cases and there are good facilities for postgraduate study for the M.R.C.P. examination.

Applications, with copies of recent testimonials, to M. J. HUNTLEY, Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, by 26th June, 1957.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN MANAGEMENT COMMITTEE, Hackney-road, E.2, Shadwell, E.1, and BANSTEAD WOOD, SURREY. Applications are invited for the appointment of RESIDENT MEDICAL OFFICER (Male or Female) graded Senior House Officer, at Shadwell, E.1, to become vacant 1st September, 1957. Candidates must have had experience in the treatment of sick children. The appointment will be for 1 year.

Application forms may be obtained from the Secretary at Hackney-road, and should be returned, with copies of not more than 3 testimonials, not later than 1st July, 1957.

QUEEN ELIZABETH HOSPITAL FOR CHILDREN, Hackney-road, E.2. OPHTHALMIC ASSISTANT required. Attendance required on Thursday mornings. Salary £175 p.a.

Applications, with copies of available testimonials, to Group Secretary.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE SURGEON (pre-registration) for 6 months commencing as soon as possible. Post recognised for F.R.C.S.

Applications, with 2 recent testimonials, to Hospital Secretary by 22nd June, 1957.

QUEEN MARY'S HOSPITAL FOR THE EAST END, Stratford, E.15. HOUSE PHYSICIAN (pre-registration) required for 6 months commencing 2nd July, 1957.

Applications, with copies of recent testimonials, to Hospital Secretary by 26th June, 1957.

PRINCE OF WALES'S GENERAL HOSPITAL, N.15. Applications are invited for the post of RESIDENT HOUSE SURGEON (Senior House Officer) to Orthopædic, Casualty and E.N.T. Departments, at the above Hospital for a period of 6 months, vacant 10th August.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15, to be returned by 1st July, 1957.

PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (general surgery), resident.

Application forms from the Group Secretary, St. Luke's Hospital, Sydney-street, Chelsea, S.W.3, to be returned within 14 days of date of advertisement (enclose foolscap stamped addressed envelope).

ROYAL EYE HOSPITAL, St. George's-circus, S.E.1. Resident Locum SENIOR HOUSE SURGEONS required for holiday periods during the summer months. £15 10s. per week with deduction for board and lodging.

Apply Secretary.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1. Applications are invited for the appointment of SENIOR ORTHOPÆDIC REGISTRAR (full-time), non-resident. Applicants must be Fellows of 1 of the Royal Colleges of Surgeons. During the tenure of office 1 year may be spent at the Luton and Dunstable Hospital and 6 months at The Hospital for Sick Children, Great Ormond-street.

Applications to be received not later than 6th July. Forms of application from the House Governor, 234, Great Portland-street, London, W.1.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Great Portland-street, London, W.1, AND BROCKLEY HILL, STANMORE, MIDDLESEX. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (4 vacancies) for a period of 6 months. 2 to commence duties at Great Portland-street on 18th August, 1957, and 25th September, 1957, respectively ; 2 to commence duties at the Country Hospital, Stanmore, on 30th July, 1957, and 3rd September, 1957, respectively.

Applications, stating preference, to be received by 28th June, 1957. Forms of application can be obtained from the House Governor at 234, Great Portland-street, London, W.1.

SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN, Clapham Common, S.W.4. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Woman), Senior House Officer grade. Appointment is for 6 months, renewable. Duties include care of children's ward ; medical beds ; E.N.T. and administration. Offers suitable experience to those intending to enter General Practice. Vacant 31st July, 1957.

Form of application from the Secretary.

ST. ANN'S GENERAL HOSPITAL, N.15. Applications are invited for the appointment of RESIDENT HOUSE SURGEON (third post) to above Hospital for a period of 6 months. Vacant immediately.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

ST. BARTHOLOMEW'S HOSPITAL, E.C.1. Applications are invited for the post of Whole-time SENIOR HOUSE OFFICER or REGISTRAR in the Department of Diagnostic Radiology. The post is non-resident and the appointment made will depend on the qualifications and experience of the successful applicant. The appointment will be tenable from 1st October, 1957, or by arrangement and will be for 1 year in the first instance.

Applications, with the names of 2 referees, should be submitted to the undersigned within the next 10 days.

C. C. CARUS-WILSON, Clerk to the Governors.

ST. JAMES' HOSPITAL, Balham, S.W.12. South West METROPOLITAN REGIONAL HOSPITAL BOARD. Part-time REGISTRAR, 7 sessions per week, for Ophthalmic Unit (18–20 Beds and outpatient clinics). Resident or non-resident. Post vacant now.

Application forms, obtainable from Group Secretary, Wandsworth Hospital Group, at above address, to be completed and returned as soon as possible. (0318.)

ST. JAMES' HOSPITAL, Balham, S.W.12. Locum REGISTRAR (radiology) required for 4 weeks during annual leave.

Applications, stating full details and names of 2 referees and dates available, to Group Secretary at above address. (0333.)

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute General—192 Beds). Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE SURGEON. Post vacant 2nd July, 1957.

Applications, with copies of 2 testimonials, to the Hospital Secretary by 22nd June, 1957.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. (Acute General—192 Beds.) Applications are invited from registered or provisionally registered medical practitioners for the post of HOUSE PHYSICIAN for 6 months commencing 7th July, 1957.

Applications, with 2 recent testimonials, to be sent to the Hospital Secretary by 22nd June, 1957.

ST. LEONARD'S HOSPITAL, Nuttall-street, London, N.1. Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) for 1 year.

Applications, with 2 recent testimonials, to the Hospital Secretary by 29th June, 1957.

ST. THOMAS'S HOSPITAL, London, S.E.1. Obstetric HOUSE PHYSICIAN at the General Laying-in Bed Hospital, York-road, S.E.1, for a period of 6 months from 4th September, 1957. Resident. Approved service for M.R.C.O.G.

Applications from fully registered medical practitioners only, to the Clerk of the Governors by 29th June, 1957, naming 2 referees.

UNIVERSITY COLLEGE HOSPITAL, Gower-street, W.C.1. Applications are invited for the post of MEDICAL REGISTRAR for 1 year in the first instance from 1st October, 1957. This post will include a period of duty at the Whittington Hospital, London, N.19. Preference will be given to candidates holding higher qualifications.

Applications, with names of 2 referees, to Administrator and Secretary by 26th June, 1957.

UNIVERSITY COLLEGE HOSPITAL AND THE NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SENIOR REGISTRAR in Psychological Medicine required at University College Hospital and the Child Guidance Clinic, Osnaburgh-street, N.W.1, for 1 year in the first instance from 1st August, 1957. The successful candidate will be required to attend 7 half-days a week at University College Hospital (Department of Psychological Medicine—adult clinic) and 4 half-days a week at the Child Guidance Training Centre, Osnaburgh-street. Preference will be given to candidates with higher qualifications.

Applications, naming 3 referees, to Administrator and Secretary, University College Hospital, Gower-street, W.C.1, by 28th June.

WANSTEAD HOSPITAL, Hermon Hill, E.11. (191 Beds.) Applications are invited for the post of CASUALTY OFFICER (recognised for F.R.C.S.), graded Senior House Officer, vacant 22nd June, 1957. Salary £819 10s. p.a., less £150 p.a. for board, lodging, &c.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WANSTEAD HOSPITAL, Hermon Hill, London, E.11. (191 Beds.) HOUSE SURGEON required. Recognised for F.R.C.S.

Applications, with full details and copies of 2 recent testimonials, should be sent immediately to Secretary, Forest Group Hospital Management Committee, Langthorne-road, E.11.

WHIPPS CROSS HOSPITAL, Leytonstone, E.11. Leytonstone (NO. 10) GROUP HOSPITAL MANAGEMENT COMMITTEE. Temporary CLINICAL ASSISTANT required for the Ophthalmic Unit at above Hospital for approximately 6 months (pending a review of the establishment). 3 sessions per week—viz., Tuesday P.M., Thursday A.M., and Saturday A.M. Salary £551 15s. p.a.

Applications to the Hospital Secretary as soon as possible.

WILLESDEN GENERAL HOSPITAL, Harlesden-road, N.W.10. Applications are invited for the following 6 months appointments :—

RESIDENT CASUALTY OFFICER (Senior House Officer) from 8th July. Post recognised for Fellowship.

RESIDENT HOUSE PHYSICIAN from 10th July. Pre-registration candidates eligible.

Applications, with full particulars and names of 2 referees, to be sent to Hospital Secretary by 19th June.

ABERDEEN SPECIAL HOSPITALS BOARD OF MANAGEMENT Applications are invited for the post of REGISTRAR in Chest Diseases for duties in the Regional Chest Clinic and at Tor-na-Dee and Glen O' Dee Sanatoria. A Thoracic Surgery Unit is located at Tor-na-Dee and the appointment offers valuable training in the assessment and selection of cases for major chest surgery and in their preoperative and post-operative management. Residence will be required at or near Tor-na-Dee and single accommodation is available in the Sanatorium itself.

Applications, together with the names and addresses of 2 referees, should be sent to the Secretary, Board of Management, Aberdeen Special Hospitals, 6, Queen's-terrace, Aberdeen, as soon as possible after the appearance of this advertisement.

ALTRINCHAM GENERAL HOSPITAL, ANNEXE AND E.N.T. DEPARTMENT. (183 Beds.) SENIOR HOUSE OFFICER (medical). This appointment is in a busy hospital and offers excellent opportunities of practical experience. Post vacant end of June.

Applications, together with 2 recent testimonials, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.) STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON for Traumatic and Orthopædic Unit. 6 months appointment, suitable for pre-registration candidate.

Applications, stating age, qualifications and experience with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

AYLESBURY. ROYAL BUCKINGHAMSHIRE HOSPITAL. Accident and Orthopædic and Children's General Surgery. HOUSE OFFICER or SENIOR HOUSE OFFICER. Grade according to experience. Pre-registration post but registered practitioners invited to apply. Recognised for F.R.C.S.

Apply, with copies of 2 testimonials, to Secretary-Superintendent.

BEDFORD GENERAL HOSPITAL. (436 Beds.) House SURGEON required. Pre- or post-registration. Recognised for F.R.C.S. Post offers exceptional opportunities for general experience in busy acute Surgical Units.

Inquiries and applications, with copies of 2 recent testimonials, to Group Secretary, 3, Kimbolton-road, Bedford.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) HOUSE PHYSICIAN (House Officer or Senior House Officer grading according to experience). Pre-registration post, but fully qualified practitioners may apply.

Apply Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 Beds.) Locum ORTHOPÆDIC HOUSE SURGEON (Senior House Officer or House Officer grading according to experience).

Applications to Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON (first, second or third post), vacant now. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply Group Secretary.

BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL. (229 acute beds.) HOUSE OFFICER in Obstetrics and Gynæcology. Pre-registration post, House Officer or Senior House Officer grading according to experience. Vacant shortly. Hospital has Maternity Unit of 22 Beds and Gynæcological Annexe of 18 Beds. Fully qualified practitioners may apply. Married quarters may be available.

Detailed applications to Group Secretary.

BIRMINGHAM ACCIDENT HOSPITAL, Bath-row, BIRMINGHAM, 15. (215 Beds and 8 House Surgeons.) HOUSE SURGEONS (resident), vacant June. Hospital largest Traumatic Unit in country and treats over 50,000 new patients each year. Recognised for purpose of casualty by R.C.S. (Eng.). Teaching programme by Consultant staff. 6-month appointment, some of which may be spent in 42-bedded Medical Research Council's Burns Unit.

Apply, naming 2 referees, to Administrator by 29th June, 1957.

BIRMINGHAM, 18. DUDLEY ROAD HOSPITAL. 3 HOUSE SURGEONS required. Vacant 1st and 4th July and 1st August, 1957. Recognised for pre-registration and F.R.C.S. Each appointment in a unit of approximately 85 adult and children's general surgical beds under control of 2 Consultant Surgeons.

Detailed applications, with copies of 2 recent testimonials, to Group Secretary.

BIRMINGHAM. HIGHCROFT HOSPITAL, Erdington, BIRMINGHAM, 23. JUNIOR HOSPITAL MEDICAL OFFICER. This Mental Hospital (1227 Beds) provides opportunities for experience and training in all branches of psychiatry, and is recognised as a training centre for the D.P.M.

Applications, giving personal particulars and qualifications, should be submitted to the Medical Superintendent within 14 days.

BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL. PÆDIATRIC HOUSE PHYSICIAN (Male/Female). Post vacant 1st August, 1957. Recognised for D.C.H., includes duties on infectious diseases wards, Neonatal Department and clinics.

Applications to the Physician-Superintendent by 24th June, 1957.

BIRMINGHAM. LORDSWOOD MATERNITY HOSPITAL, HARBORNE, BIRMINGHAM, 17. RESIDENT OBSTETRIC HOUSE OFFICER. Commencing 1st July. 33 Beds dealing with normal and abnormal midwifery. Recognised for D.Obst. R.C.O.G. Second Period Training School for Pupil Midwives.

Apply Obstetrician not later than 19th June, with copies of testimonials.

BIRMINGHAM REGIONAL HOSPITAL BOARD.

(1) Dudley Stourbridge Group, The Guest Hospital, Dudley

REGISTRAR (anæsthetics). Experience specialty essential. Duties at The Guest, Corbett and Wordsley Hospitals. Opportunity for experience in general surgery, gynæcology, orthopedics, and plastic surgery with the Regional Plastic Surgery Unit. Resident at Wordsley Hospital. Married accommodation available.

(2) Stoke-on-Trent Group, Princes-road, Stoke-on-Trent

REGISTRAR (medical) for City General Hospital (845 Beds). Higher qualification desirable but not essential. Duties in acute Medical Unit (150 Beds) and large Outpatients Department. Facilities for research particularly in cardiology and respiratory diseases.

(3) Wolverhampton Group, The Royal Hospital, Wolverhampton

REGISTRAR (pathology), resident or partly resident. Experience in specialty an advantage. Duties in all branches of clinical pathology centred on the Royal Hospital.

(4) Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29

*REGISTRAR (radiology) for Selly Oak Hospital (1055 Beds) with associated Maternity, Eye, E.N.T. and I.D. Hospitals. All forms of radio-diagnostic work undertaken. Hospital recognised for Part II D.M.R.D. Diploma in Radiology desirable but consideration given to holders of Part I only.

Application forms from Group Secretaries to be returned by 24th June, 1957, except vacancy marked * which is to be returned within 28 days of the appearance of this advertisement.

BIRMINGHAM, 13. SORRENTO MATERNITY HOSPITAL. (106 Beds, including 24 premature baby cots.) OBSTETRIC HOUSE SURGEON. Appointment recognised for D.Obst. R.C.O.G. Hospital affiliated to Birmingham Medical School for training of students.

Applications for the above post, vacant 1st August, 1957, should be sent to the Obstetrician, Sorrento Maternity Hospital, not later than 19th June.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS AND THE BIRMINGHAM REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of NON-RESIDENT DERMATOLOGICAL REGISTRAR (Senior Registrar grade). Duties will include sessions at the Queen Elizabeth Hospital and other units of the Teaching Hospital and at the Skin Hospital, Birmingham. Candidates must be registered medical practitioners, have had previous experience in the specialty, and should possess the M.R.C.P.

Forms of application may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned not later than 29th June, 1957.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. The following resident appointment is available for the 6 months period commencing 7th July, 1957. Recognised for pre-registration candidates but registered medical practitioners may apply.

Children's Hospital

HOUSE SURGEON. This post rotates between the 3 main surgical wards to give experience in all branches of surgery.

Forms of application may be obtained from the undersigned.

G. A. PHALP,
Secretary and Principal Administrative Officer.
United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the appointment of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at the Queen Elizabeth Hospital, Birmingham. There are 4 residents attached to the Department of Clinical Pathology. In addition to affording general experience in hæmatology, bacteriology and some biochemistry, the appointment can provide opportunities for those studying for higher qualifications in medicine. The appointment is tenable for 1 year.

Application forms should be obtained from the Secretary to the Board of Governors, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS. Applications are invited for the post of SENIOR PSYCHIATRIC REGISTRAR (Senior Registrar grade) to the United Birmingham Hospitals. The appointment, tenable at the Queen Elizabeth and Midland Nerve Hospitals, will be for 1 year in the first instance, subject to annual review. The successful candidate may subsequently be required to spend not more than 2 years in a selected Hospital of the Birmingham Regional Hospital Board, in accordance with an arrangement for the interchange of Registrars between the 2 Boards. Candidates should hold the D.P.M.

Application forms to be obtained from the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned by 29th June, 1957.

BIRMINGHAM, 29. SELLY OAK HOSPITAL. (1055 Beds.) SENIOR HOUSE OFFICER (E.N.T. Department—42 Beds), resident.

Applications to Medical Superintendent.

BIRMINGHAM. SOLIHULL HOSPITAL, Lode-lane, SOLIHULL. HOUSE PHYSICIAN (pre-registration post), vacant mid-July. General Hospital offering good experience. 5 other resident medical staff.

Applications, with names of 2 referees, to Medical Superintendent as soon as possible.

BIRMINGHAM. ST. CHAD'S HOSPITAL, Hagley-road, BIRMINGHAM, 16. HOUSE SURGEON, vacant 7th July, 1957, for duties in general surgery. Recognised for pre-registration.

Detailed applications, with recent testimonials, to the Group Secretary, Dudley Road Hospital, Birmingham, 18.

BURY ST. EDMUNDS. WEST SUFFOLK GENERAL HOSPITAL. (262 Beds.) Applications invited, with 3 references, for a HOUSE OFFICER or SENIOR HOUSE OFFICER for orthopædic and casualty duties. Recognised for F.R.C.S. (Surgical). Vacant late June. A Junior Hospital Medical Officer Casualty Officer is also employed.

Inquiries to Hospital Secretary.

BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.

Royal Infirmary, Blackburn

HOUSE SURGEONS (2) required for 23rd July and 1st August. Posts recognised for F.R.C.S. and approved for pre-registration purposes.

HOUSE PHYSICIAN required for 23rd July. Post recognised for pre-registration purposes.

Queen's Park Hospital, Blackburn

HOUSE SURGEON required for 30th July. Post recognised for F.R.C.S. and approved for pre-registration purposes.

HOUSE PHYSICIANS (2) required for 1st and 3rd August. Post recognised for pre-registration purposes.

Victoria Hospital, Accrington

SENIOR HOUSE OFFICER (medicine) required for 22nd July.

Apply to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

BOLTON. THE ROYAL INFIRMARY. (237 Beds.) MANCHESTER REGIONAL HOSPITAL BOARD. RESIDENT REGISTRAR in General Surgery (Resident Surgical Officer). Recognised for F.R.C.S. The post is the senior resident surgical appointment and offers excellent practical experience.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, should be sent immediately to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of NON-RESIDENT SENIOR HOUSE OFFICER (orthopædics and casualty combined). The post, which is recognised for the F.R.C.S. examination, is now vacant. The Unit consists of Registrar and 2 Senior House Officers with an additional Senior House Officer during the summer months. Furnished flat available on sea front.

Applications to the Hospital Secretary.

BOURNEMOUTH. ROYAL VICTORIA HOSPITAL, Shelley-road, BOSCOMBE. (494 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of GENERAL HOUSE SURGEON. The appointment, which is recognised for the F.R.C.S. examination and pre-registration purposes, becomes vacant on 15th July, 1957.

Applications to the Hospital Secretary.

BRADFORD, 1. ROYAL EYE AND EAR HOSPITAL. SENIOR HOUSE SURGEON (ophthalmology). Recognised for D.O.M.S. and F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, with copy testimonials, to Secretary, Bradford Royal Infirmary.

BRIGHTON. ROYAL SUSSEX COUNTY HOSPITAL. (312 Beds.)

HOUSE SURGEON required mid-July.

2 CASUALTY HOUSE SURGEONS (duties include work in Orthopædic and Traumatic Unit), vacant beginning and end July.

All posts recognised for pre-registration and F.R.C.S.

Applications, stating usual particulars, and naming 2 referees, to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

BRIGHTON GENERAL HOSPITAL. Applications are invited for the appointment of HOUSE SURGEON to the Orthopædic Unit. Salary in accordance with national scale. Vacant 24th June, 1957. This post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, and experience, together with copies of recent testimonials, should be sent to the Physician-Superintendent, Brighton General Hospital, Elmgrove, Brighton.

BROMSGROVE GENERAL HOSPITAL, Worcestershire. (423 Beds.) Applications are invited for the pre-registration posts of :—

HOUSE SURGEON. Post vacant now,

HOUSE PHYSICIAN. Post vacant July,

at the above Hospital.

Applications, with the names of 3 referees, to the Hospita Secretary.

BURTON-ON-TRENT. GENERAL HOSPITAL. Non-RESIDENT JUNIOR HOSPITAL MEDICAL OFFICER ANÆSTHETIST required at the above Hospital.

Applications to Group Secretary, General Hospital, Burton-on-Trent, as soon as possible.

BURTON UPON TRENT. THE GENERAL HOSPITAL. Applications invited from registered medical practitioners for post of RESIDENT MEDICAL OFFICER (Senior House Officer grade) to the Medical Unit of 64 Beds.

Applications to the Group Secretary within 10 days of appearance of this advertisement

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in Anæsthetics to the above Group. The successful applicant will be based at Bury General Hospital. The post is recognised for the Diploma in Anæsthetics.

Apply, stating full details of age, experience, and names of 2 referees, to H. WILKINSON, Group Secretary.

Bury General Hospital, Bury, Lancs.

BURY AND ROSSENDALE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics, to the above Group of hospitals. The post, which will become vacant on 1st October, 1957, is based at Bury General Hospital, and is recognised for the D.A. examination.

Apply, stating full details, and names of 2 referees, to—

H. WILKINSON, Esq., Group Secretary.

Bury General Hospital, Walmersley-road, Bury, Lancs.

BISHOP AUCKLAND, co. DURHAM. THE GENERAL HOSPITAL. (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required. Recognised pre-registration post.

Apply, naming 2 referees, to K. G. T. LUXFORD, Group Secretary, at the above address.

BISHOP'S STORTFORD, HERTFORDSHIRE. HERTS AND ESSEX GENERAL HOSPITAL. Locum REGISTRAR (anæsthetics), resident, required immediately. Appointment for 3 months in first instance, and thereafter on week-to-week basis.

Applications to Hospital Secretary (Tel. : Bishop's Stortford 963).

CARLISLE. CUMBERLAND INFIRMARY. (331 Beds.) Applications are invited for the following appointments :—

HOUSE OFFICERS, vacant 1st August, 1957. Recognised for pre-registration purposes :—

3 General Surgery. Recognised for F.R.C.S. examination.

1 Gynæcology—with some obstetrics.

SENIOR HOUSE OFFICERS, now vacant :—

1 Specials (E.N.T. and eyes).

1 Orthopædics.

Apply to the Group Secretary, Cumberland Infirmary, Carlisle.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the post of SENIOR HOUSE OFFICER (anæsthetics).

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications are invited for the post of ORTHOPÆDIC HOUSE OFFICER (pre- or post-registration), for the 6 months commencing 1st August, 1957.

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

CARMARTHEN. WEST WALES GENERAL HOSPITAL. (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (surgical) which will become vacant on 1st August, next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. HOUSE SURGEON (post approved for Pre-registration Service). General surgery with duties in genito-urinary. Vacant mid-June.

Applications, giving age, qualifications, &c., with copies of recent testimonials and the names of referees, should be sent to Secretary, at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. ORTHOPÆDIC AND CASUALTY OFFICER (Senior House Officer). Post recognised for F.R.C.S. Vacant end July.

Applications, stating age, qualifications and experience, with copies of testimonials and the names of 2 referees, should be sent to the Group Secretary at above address.

CARSHALTON, SURREY. ST. HELIER HOSPITAL. HOUSE SURGEON required on Surgical Unit of 78 Beds. Post recognised for F.R.C.S. examination and approved for pre-registration experience.

Applications, stating age, qualifications, and experience, with copies of recent testimonials and the names of 2 referees, should be sent to the Secretary at above address.

CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House OFFICER (E.N.T. Department) for 6 months from early August. Pre-registration (surgical) or post-registration applicants will be considered.

Apply, stating age, nationality, qualifications and experience with dates, and copies of 3 testimonials, to the Secretary by 29th June.

CANTERBURY. KENT AND CANTERBURY HOSPITAL. (277 Beds.) GYNÆCOLOGICAL HOUSE SURGEON required at Highland Court Annexe, a unit of 25 gynæcological beds situated 3 miles from the above Hospital, with all ancillary services available. Recognised for M.R.C.O.G. 6 months appointment. Post now vacant. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

CARDIFF. GLAN ELY TUBERCULOSIS HOSPITAL, FAIRWATER, CARDIFF. SENIOR HOUSE OFFICER required to commence 1st July, 1957, at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

CARDIFF. THE UNITED CARDIFF HOSPITALS. Applications are invited for the appointment of REGISTRAR in Neurology at the Cardiff Royal Infirmary, to commence as soon as possible.

Application forms are available from the Secretary to the Board, at the Cardiff Royal Infirmary, Newport-road, Cardiff, and should be returned within 14 days of the appearance of this advertisement.

CHELTENHAM MATERNITY HOSPITAL. Cheltenham GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of RESIDENT OBSTETRIC OFFICER. The Hospital which is recognised for the purpose of training for the D.Obst.R.C.O.G. has 50 Beds and deals with the majority of abnormal midwifery cases in North East Gloucestershire. The appointment is for a period of 6 months and the salary will be £467 10s., £522 10s. or £577 10s., less charge for residential emoluments. The appointment is vacant immediately.

Applications, stating age, qualifications and experience and accompanied by copies of 3 recent testimonials, should be sent to the Secretary, Cheltenham Group Hospital Management Committee, General Hospital, Cheltenham.

CHEPSTOW, MONMOUTHSHIRE. ST. LAWRENCE HOSPITAL. (127 plastic surgery, 50 orthopædic beds.) PLASTIC SURGERY, JAW INJURIES AND BURNS CENTRE. SENIOR HOUSE OFFICER in Plastic Surgery required. There are 2 residents in plastic surgery and 1 in orthopædics. Post tenable 6 or 12 months as desired, and candidates experienced in another specialty wishing to gain plastic surgery experience will be considered. Salary £819 10s., less £150 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

CHICHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum GYNÆCOLOGY AND OBSTETRIC REGISTRAR required for month of July.

Apply Group Secretary, 174, Broyle-road, Chichester.

CHICHESTER. ROYAL WEST SUSSEX HOSPITAL. (202 acute beds.) SENIOR HOUSE SURGEON (Deputy Resident Surgical Officer) required at above Hospital. Post recognised for F.R.C.S. Resident staff of 6—Resident Surgical Officer, 3 House Surgeons, Resident Medical Officer, and House Physician. Salary £819 10s. p.a., less residential charge. Vacant 4th August, 1957.

Applications, stating age, experience, qualifications with references, or names of referees, to Senior Administrative Officer.

COLCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for :—

Essex County Hospital, Colchester, Essex (185 Beds)

Post of HOUSE OFFICER (surgical). First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

Post of SENIOR HOUSE OFFICER (casualty and radiotherapy). Post tenable for 6 months or 1 year. Recognised for F.R.C.S.

Post of Locum Tenens ANÆSTHETIC REGISTRAR. For 2 weeks commencing 8th July, 1957, for duties at Essex County Hospital and other hospitals in Group.

Essex County Hospital (19 gynæcological beds)
Colchester Maternity Hospital (22 obstetric beds)

Post of HOUSE OFFICER (Male or Female), obstetric and gynæcological. First, second, third or pre-registration post ; tenable for 6 months.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

CHELMSFORD HOSPITALS. Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer) to large surgical units.

Applications, stating age, qualifications, and experience, with recent testimonials, should be sent to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

DERBY CITY HOSPITAL. (256 Beds. Post recognised for training for the D.A.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (anæsthetics) required. Post becomes vacant 10th August. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 24th June, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) SENIOR HOUSE OFFICER (orthopædic), vacant 1st July. Recognised for 6 months "unspecified" training for F.R.C.S.

Apply, giving full details and 2 names for reference, to Secretary.

DERBY. DERBYSHIRE ROYAL INFIRMARY. (416 Beds.) RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), vacant August, 1957. Preference will be given to an applicant who is studying for a higher qualification in any branch of medicine, not necessarily pathology. The holder is expected to attend clinical work in the Royal Infirmary and sometimes in associated hospitals.

Apply, stating full details and 2 names for reference, to Secretary.

DOUGLAS, ISLE OF MAN. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications are invited from registered medical practitioners with previous hospital experience, preferably at a teaching hospital, for the post of SENIOR HOUSE SURGEON at this busy General Hospital. The Senior of 4 House Officer posts. The post becomes vacant mid-June, and is suitable for candidate seeking further clinical experience and opportunity for reading for higher qualifications. Recognised for F.R.C.S. National Health Service salary and conditions of service.

Applications, giving relevant particulars, and copies of 2 recent testimonials, or names and addresses of 2 referees, should be forwarded to the Secretary, Noble's Isle of Man Hospital, Douglas.

DOUGLAS. NOBLE'S ISLE OF MAN HOSPITAL. (160 Beds.) Applications invited for pre-registration post of HOUSE SURGEON. Salary in accordance with Whitley scale. 4 residents on staff. Post now vacant.

Apply to the Secretary, Noble's Hospital, Douglas, Isle of Man.

DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL GROUP, BIRMINGHAM REGION.

The Guest Hospital, Dudley (154 Beds)

SENIOR HOUSE OFFICER (casualty). Post now vacant.
HOUSE OFFICER (medical), pre-registration. Post vacant 1st July, 1957.

Wordsley Hospital, near Stourbridge (478 Beds)

SENIOR HOUSE OFFICER (surgical).
HOUSE OFFICER (medical), pre-registration. Post vacant 13th July, 1957.
HOUSE OFFICER (surgical), pre-registration. Post vacant 20th July, 1957.

The Corbett Hospital, Stourbridge (114 Beds)

HOUSE OFFICER (surgical), pre-registration. Post vacant 6th July, 1957.

Apply, Group Secretary, Guest Hospital, Dudley.

DURHAM HOSPITAL MANAGEMENT COMMITTEE.

Dryburn Hospital, Durham (303 Beds)

HOUSE PHYSICIAN for Pædiatric Unit of 42 Beds. Approved pre-registration post and recognised for the D.C.H.

SENIOR HOUSE PHYSICIAN for Pædiatric Unit of 42 Beds. The appointment is suitable for fully registered practitioners and is of 1 years duration from 1st August, 1957.

SENIOR HOUSE OFFICER in Surgery. This is a post with shared duties between the Departments of General Surgery, E.N.T., and Eyes.

HOUSE SURGEON (general surgery). Approved pre-registration appointment and recognised under the F.R.C.S. regulations.

HOUSE PHYSICIAN (general medicine). Approved pre-registration post.

SENIOR HOUSE OFFICER in Anæsthetics. Post recognised for D.A. and F.F.A.R.C.S. Previous experience in anæsthetics is not essential.

General Hospital, Chester-le-Street (204 Beds)

HOUSE PHYSICIAN (general medicine). Approved pre-registration post.

All the above posts are vacant on 1st August, 1957.

Apply, with particulars of previous experience and names of 2 referees, to Group Secretary, Dryburn Hospital, Durham.

ENFIELD, MIDDLESEX. CHASE FARM HOSPITAL. RESIDENT HOUSE SURGEON (approved pre-registration, first or second post), vacant 16th August, 1957. Duties with General Surgical Unit. Recognised by Royal College of Surgeons. 6 months appointment.

Applications, with the names and addresses of 2 referees, to Group Secretary, Enfield Group Hospital Management Committee, Chase Farm Hospital, by 29th June, 1957.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners of either sex for the appointment of SENIOR HOUSE OFFICER in Clinical Pathology (resident), vacant 27th August, 1957. The successful candidate will be responsible for emergency pathological and blood-transfusion duties, and will work, under the Area Pathologist, in different branches of clinical pathology.

Applications, naming 2 referees, to the Hospital Secretary by 29th June, 1957.

EXETER. ROYAL DEVON AND EXETER HOSPITAL. Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (surgical), Resident Surgical Officer. The post is recognised for the F.R.C.S. examination. Vacant 1st July, 1957.

Applications, with copies of 2 recent testimonials, to the Hospital Secretary by 22nd June, 1957.

EPPING. ST. MARGARET'S HOSPITAL. House SURGEON (pre- or post-registration) to very busy General Surgical Unit. Hospital within easy reach of Central London. Post vacant 1st July, 1957.

Applications, with copies of testimonials, including 1 from medical school, to be sent immediately to the Group Secretary, Epping Group Hospital Management Committee, "Oak Cottage," The Plain, Epping, Essex.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE PHYSICIAN required 1st August. Pre-registration post.

Applications, stating age, qualifications and experience, with copies of 2 recent testimonials, should be sent by 26th June to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE OFFICER (obstetrics and gynæcology) required 1st August, 1957. Pre-registration post. Recognised in obstetrics by the College for M.R.C.O.G. and D.Obst.R.C.O.G. purposes.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent by 26th June to Group Secretary at above address.

EPSOM DISTRICT HOSPITAL, Dorking-road, Epsom, SURREY. RESIDENT HOUSE SURGEON required 5th August. Pre-registration post. Recognised for F.R.C.S.

Applications, stating age, qualifications and experience with copies of 2 recent testimonials, should be sent as soon as possible to Group Secretary at above address.

GLASGOW ROYAL INFIRMARY. Senior House Officer in Surgery (urology). Duties in the Urological Department at above Infirmary.

Write, giving 3 names for reference, not later than 29th June, 1957, to the Secretary, Board of Management for Glasgow Royal Infirmary and Associated Hospitals, 135, Buchanan-street, Glasgow, C.1.

GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædic). Orthopædic Unit of 71 Beds. Resident establishment—Registrar and 2 House Officers. Up-to-date Medical Library and reading facilities available.

Applications, with names of 2 referees, to Hospital Secretary.

HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL. HOUSE SURGEON (pre-registration) required.

Applications, giving full details and copies of recent testimonials, should be sent to the Hospital Secretary at once.

HEMEL HEMPSTEAD, HERTFORDSHIRE. ST. PAUL'S AND WEST HERTS HOSPITALS. HOUSE PHYSICIAN (pre-registration) required to commence 5th July, 1957.

Applications, giving details and enclosing copies of 2 recent testimonials, should be sent to the Secretary, St. Paul's Hospital, Hemel Hempstead, Herts, at once.

HERTFORD COUNTY HOSPITAL. (171 Beds. Hospital situated 21 miles from London.) Applications are invited for appointment of RESIDENT HOUSE PHYSICIAN (Male or Female), second post held. Recognised pre-registration post. 6 months appointment. Preference given to applicants who have held resident surgical or medical posts in general hospital. Duties to commence immediately.

Applications to Group Secretary, Hertford Hospital Management Committee, County Hospital, Hertford, Herts.

HITCHIN HOSPITALS, Hitchin, Hertfordshire. Resident ANÆSTHETIST (Senior House Officer) required 1st July, 1957. Recognised for D.A. and F.F.A.R.C.S. examinations.

Applications, stating age, nationality, qualifications, and experience, together with names of 2 referees, to the Medical Administrator, Lister Hospital, Hitchin, by 29th June, 1957.

HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required, to commence duty immediately. The post is recognised as a pre-registration appointment and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

HUNTINGDON COUNTY HOSPITAL. Applications are invited for the post of HOUSE OFFICER (surgical), vacant mid-June. Post recognised for pre-registration purposes.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

HASTINGS HOSPITAL MANAGEMENT COMMITTEE. Locum ORTHOPÆDIC REGISTRAR required for whole-time duties. First 2 weeks in July. Remuneration £19 5s. per week. Non-resident.

Apply, giving details of qualifications and experience, to Group Secretary, Hastings Hospital Management Committee, 11, Holmesdale-gardens, Hastings.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (surgical) which will become vacant on 1st August, next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

HAVERFORDWEST. PEMBROKE COUNTY WAR MEMORIAL HOSPITAL. (163 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the pre-registration post of RESIDENT HOUSE OFFICER (medical) which will become vacant on 1st August, next. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

ILFORD, ESSEX GOODMAYES HOSPITAL. Senior HOUSE OFFICER required for mental hospital situated within easy reach of the centre of London. All forms of modern psychiatric treatment available. Facilities given to study for higher qualifications. Salary £819 10s. p.a., less £150 for residential amenities, if resident.

Applications, stating age, experience and qualifications, to Physician-Superintendent, with 2 copies of recent testimonials, as soon as possible.

ILFORD ISOLATION HOSPITAL, Grove-road, Chadwell HEATH (near London). There will be a vacancy for a SENIOR HOUSE OFFICER at the above Hospital. Salary will be at the rate of £819 10s. p.a., less emoluments. Small furnished bungalow available. This post will include some general medical duties and is suitable for persons studying for the M.R.C.P. and D.C.H.

Applications, giving particulars of experience and qualifications and accompanied by copies of testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Resident Anæsthetist). The post, which becomes vacant on 1st July, 1957, and is normally of 1 years duration, is recognised for the D.A. and the F.F.A.R.C.S. examinations.

Applications, stating age and nationality, together with recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Senior Consultant General Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

IPSWICH AND EAST SUFFOLK HOSPITAL. Heath ROAD WING, IPSWICH. (280 Beds.) Post of HOUSE SURGEON (pre-registration), to 2 General Surgeons, vacant 2nd July, 1957. Recognised for R.C.S. examinations.

Applications with full details, and recent testimonials to Hospital Secretary.

KENDAL. WESTMORLAND COUNTY HOSPITAL. (82 Beds.) SENIOR HOUSE OFFICER (obstetrics and gynæcology). The post is resident or non-resident, and normally tenable for 1 year. Successful applicant will be attached to the Specialist Unit. Post vacant now.

Applications, with full particulars and names of 2 referees, to be addressed to Group Secretary, Royal Lancaster Infirmary, Lancaster.

KETTERING AND DISTRICT GENERAL HOSPITAL, NORTHANTS. Applications are invited for the post of HOUSE SURGEON (pre-registration), vacant immediately. Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary, Rothwell-road, Kettering.

KIDDERMINSTER AND DISTRICT GENERAL HOS-PITAL, WORCESTERSHIRE. (112 Beds.) Applications are invited for the pre-registration post of HOUSE OFFICER (House Surgeon) at the above Hospital. Post vacant immediately. Married accommodation available.

Applications, with the names of 3 referees, to the Hospital Secretary.

LANCASTER. BEAUMONT HOSPITAL. Resident SENIOR HOUSE OFFICER (E.N.T.) for a newly constructed self-contained ward and theatre unit, with attendance at out-patients at Lancaster, Kendal and Morecambe.

Applications, with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

LEICESTER. TOWERS MENTAL HOSPITAL. (1168 Beds.) Applications are invited for the whole-time post of JUNIOR HOSPITAL MEDICAL OFFICER. Salary £852 10s.–£55–£1182 10s. There is ample opportunity for experience in all branches of psychiatry including outpatient work and the Hospital is recognised for D.P.M. experience. Facilities for post-graduate training exist at Sheffield University. Resident accommodation is not available. Candidates must have completed their service with H.M. Forces.

Applications, giving age, nationality, and full details, with the names of 2 referees, to be sent to the Medical Superintendent as soon as possible.

LINCOLN COUNTY HOSPITAL, Lincoln. Applications are invited for the post of pre-registration HOUSE PHYSICIAN for the 6 months commencing 1st August. The successful candidate can, if he or she wishes, continue for a further 6 months as pre-registration House Surgeon.

Applications to Hospital Secretary.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. 2 HOUSE SURGEONS. Posts vacant 1st July, 1957, and tenable for 6 months. Recognised as pre-registration posts and for F.R.C.S.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to the Secretary of the Hospital by 24th June, 1957.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. OBSTETRIC AND GYNÆCOLOGICAL HOUSE SURGEON. Post vacant 1st July, 1957, and tenable for 6 months. Recognised as pre-registration midwifery post.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to the Secretary of the Hospital by 24th June, 1957.

LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire. 2 HOUSE SURGEONS for Accident Service, including Orthopædic Department, required 1st July, 1957. Recognised as pre-registration posts and for F.R.C.S. and tenable for 6 months.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to the Secretary of the Hospital by 24th June, 1957.

LUTON MATERNITY HOSPITAL, Luton, Bedfordshire. RESIDENT OBSTETRIC HOUSE SURGEON required 1st July, 1957. The post is tenable for 6 months in the first instance and is recognised for the D.Obst.R.C.O.G.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent by 25th June, 1957, to the Secretary, Luton and Hitchin Group Hospital Management Committee, St. Mary's Hospital, Luton, Beds.

LEEDS REGIONAL HOSPITAL BOARD. Registrar vacancies.

Anæsthetics

Halifax Group (approximately 340 Beds in the surgical specialties). Resident.

General Medicine

Hull A Group (294 general medical beds), and East Riding Group (78 general medical beds). Duties 6/11ths Hull A and 5/11ths East Riding. Holder to reside in Beverley.

Orthopædic Surgery

St. James's Hospital, Leeds (64 Beds); Public Dispensary, Leeds. Non-resident.

Otolaryngology

Huddersfield and Halifax Groups. Non-resident. Successful candidate to reside in Huddersfield. Recognised for the Fellowship and the D.L.O.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary to the Joint Registrars Committee, Park-parade, Harrogate, by 20th June, 1957.

LICHFIELD (near). ST. MATTHEW'S HOSPITAL, BURNTWOOD, LICHFIELD, STAFFS. (1330 mental beds.) BURTON-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (psychiatry) required. Resident accommodation available. Facilities for taking a D.P.M. Course at Birmingham University.

Applications, with 2 references, to the Medical Superintendent.

LIVERPOOL, 14. BROADGREEN HOSPITAL. Applications are invited for the following appointments which are recognised for pre-registration purposes and are tenable for 6 months from 1st September, 1957.

4 HOUSE PHYSICIANS (resident).
3 HOUSE SURGEONS (resident).
2 HOUSE SURGEONS (resident) (obstetrics and gynæcology) preference will be given to registered medical practitioners.
1 Admission-room CASUALTY OFFICER (non-resident).

Status either Senior House Officer or House Officer according to experience.

Salaries and conditions of service in accordance with the agreements of the Medical Whitley Councils.

Applications, on forms obtainable from the undersigned, to be returned completed as soon as possible.

H. BLYTHE, Group Secretary.

LIVERPOOL, 6. MILL ROAD MATERNITY HOSPITAL. Applications are invited for the appointment of 2 HOUSE SURGEONS in Obstetrics and Gynæcology. Posts are resident, and tenable for 6 months from 1st September. Recognised for pre-registration purposes, but preference will be given to registered practitioners. Salaries and conditions of service in accordance with the agreements of the Medical Whitley Councils.

Applications, on forms, obtainable from the undersigned, to be returned completed as soon as possible.

H. BLYTHE, Group Secretary.

Broadgreen Hospital, Liverpool, 14.

LIVERPOOL RADIUM INSTITUTE, Liverpool, 7. Applications are invited for a resident post in the JUNIOR HOSPITAL MEDICAL OFFICER grade. Salary scale £852 10s.–£55–£1182 10s. according to experience. This appointment is particularly valuable to practitioners who contemplate adopting radiotherapy as a special career. On the other hand, it provides an excellent opportunity for studying for a higher qualification either in medicine or in surgery.

Applications, giving particulars of age and experience, together with names and addresses of 2 referees, should reach the Medical Director as soon as possible.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for a post of SENIOR REGISTRAR in Pathology to take up duty as soon as possible for the period to 30th September, 1958. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application. The duties of the post will be undertaken initially at the Liverpool Royal Infirmary, although during the period of training there might be some interchange with other hospitals within the group.

Apply by 6th July on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for posts of REGISTRAR for the period 1st October, 1957–30th September, 1958. Annual reappointment until completion of the normal period of training will be considered without need for further application.

The following are the posts to be filled:

General Medicine: 2 posts.
General Surgery: 3 posts.
Psychiatry: 1 post.
Anæsthetics: 2 posts.
Pathology: 1 post.
Obstetrics and Gynæcology: 1 post.
Ophthalmology: 2 posts.

Holders of posts in surgical specialties may be required to sleep in the Hospital for their nights on duty.

Apply by 1st July on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. Applications are invited for 3 posts of REGISTRAR in Pædiatrics for the period 1st October, 1957–30th September, 1958. Annual reappointment thereafter until completion of the normal period of training will be considered without need for further application.

The duties of the posts will in the first instance be undertaken as follows:

2 at the City Branch of the Royal Liverpool Children's Hospital (1 of these posts being concerned with cardiology).
1 at the Liverpool Maternity Hospital.

Apply by 1st July, stating the post in which interested, on form obtainable from the Secretary, 80, Rodney-street, Liverpool, 1.

LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS. LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for 4 posts of SENIOR REGISTRAR in General Surgery for the period 1st October, 1957–30th September, 1958. Annual reappointment until completion of the normal period of training will be considered without need for further application. During the period of training there is normally some interchange with other hospitals, both teaching and non-teaching.

Apply by 1st July on form obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

LIVERPOOL, 6. NEWSHAM GENERAL HOSPITAL. Applications are invited for the following vacancies in September next.

4 SENIOR HOUSE OFFICERS or HOUSE PHYSICIANS (pre-registration).
1 HOUSE SURGEON (general and orthopædic surgery) (pre-registration).
1 SENIOR HOUSE OFFICER (dermatology).

All appointments may be resident or non-resident, and salaries and conditions of service are in accordance with the agreements of the Medical Whitley Council.

Application forms from, and inquiries to, the Physician-Superintendent at the Hospital.

LIVERPOOL, 15. SEFTON GENERAL HOSPITAL. (995 Beds, 116 Cots.) Applications are invited for the following resident appointments which will become vacant at the above-named Hospital on 1st September, 1957, and will be for a period of 6 months. These posts are approved as pre-registration posts.

6 HOUSE PHYSICIANS (general).
2 HOUSE PHYSICIANS (psychiatric).
3 HOUSE SURGEONS (general).
2 HOUSE SURGEONS (obstetric).
1 HOUSE PHYSICIAN (tropical).

The terms and conditions of service will be in accordance with the regulations of the Ministry of Health.

Application forms may be obtained from the undersigned to whom they should be returned not later than Tuesday, 2nd July, 1957. GARNET CHAPLIN, Secretary to the South Liverpool Hospital Management Committee.

LIVERPOOL, 9. WALTON HOSPITAL. Applications are invited for the following posts:—

SENIOR HOUSE OFFICER

Orthopædic Surgery (recognised for F.R.C.S.). Vacant 1st July, 1957.
Pathology. Vacant 1st July, 1957.
Obstetrics and Gynæcology (recognised for M.R.C.O.G. and D.Obst.R.C.O.G.). Vacant 1st September, 1957.
Neurosurgery (recognised for F.R.C.S.). Vacant 1st September, 1957.
E.N.T. Surgery (recognised for D.L.O.). Vacant 1st September, 1957.

RESIDENT HOUSE OFFICER posts (recognised for Pre-registration Service).

Medicine (7). Vacant 1st September, 1957.
General Surgery (5) (recognised for F.R.C.S.). Vacant 1st September, 1957.
Orthopædic Surgery (recognised for F.R.C.S.). Vacant 1st July, 1957.

Applications, with names and addresses of 2 referees, to Physician-Superintendent.

LLANDUDNO GENERAL HOSPITAL, Llandudno. Applications are invited for the post of HOUSE SURGEON at above Hospital. (Recognised for F.R.C.S.) The appointment is for a period of 6 months. Salary and conditions of service in accordance with those approved by the Ministry of Health.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, to be forwarded to the Group Secretary, Caernarvon and Anglesey Hospital Management Committee, Plas Gwyn, Ffriddoedd-road, Bangor, within 10 days of the appearance of this advertisement.

LOUTH, LINCOLNSHIRE. COUNTY HOSPITAL. (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER (medical), vacant 1st August, 1957, at this busy General Hospital.

Applications, with full details, together with names of 2 referees, should be addressed to the Hospital Secretary.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the Ophthalmic Department of the above Hospital. Post vacant 17th August, 1957. The Hospital is recognised by the Examining Board for the F.R.C.S. and the D.O. Salary £819 10s. a year, less £150 a year for residential emoluments.

Applications should be forwarded, as soon as possible, to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Church-street, Maidstone.

MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL. (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant 1st August, 1957. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £819 10s. a year, less £150 a year for residential emoluments.

Applications to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

MANCHESTER. BOOTH HALL CHILDREN'S HOSPITAL, BLACKLEY, MANCHESTER, 9. RESIDENT SURGICAL OFFICER (Registrar) required. Post vacant 23rd June, 1957. 3-roomed furnished flat available if required. Hospital is part of University Department of Child Health, carries out undergraduate teaching, and is recognised for D.C.H. 160 active surgical beds including all branches except thoracic surgery. Patients admitted from birth to 16 years.

Applications to Group Secretary, together with names of 2 referees, as soon as possible.

MANCHESTER, 8. CRUMPSALL HOSPITAL. Applications are invited for the resident appointment of SENIOR HOUSE OFFICER in the Genito-urinary Department, with general surgical work in another unit at the above Hospital. Recognised for F.R.C.S. Vacant 9th August, 1957.

Applications, with names of 2 referees, by 24th June, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

MANCHESTER, 19. DUCHESS OF YORK HOSPITAL FOR BABIES. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for 12 months commencing 8th July. Post is senior of 3. D.C.H. or M.R.C.P. an advantage but not essential. The Hospital is associated with the University Department of Child Health for teaching purposes.

Applications, with full details together with the names of 2 referees, to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the post of REGISTRAR in Thoracic Surgery to the Blackpool and Fylde Group of hospitals with main duties at the Victoria Hospital, Blackpool. The Post available from 24th September is recognised for the F.R.C.S. and offers a sound experience gained with the 2 Consultant Thoracic Surgeons who are responsible for the thoracic surgery in the Northern part of the Manchester Regional area.

Applications, stating age, qualifications and experience together with the names and addresses of 2 referees, should be sent to the Group Secretary, Victoria Hospital, Blackpool.

MANCHESTER. ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY, near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE.

MEDICAL HOUSE OFFICERS (2).
SURGICAL HOUSE OFFICER.

Applications invited for above resident appointments, all vacant 1st August, 1957. Each appointment is for a period of 6 months and is open to pre-registration graduates.

Applications, with testimonials or names of referees, to the Hospital Secretary not later than 1st July, 1957.

MANCHESTER. ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY, near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the resident post of SENIOR HOUSE OFFICER (surgical) vacant 1st August, 1957. Post is tenable for 6 months. Candidates should preferably have had previous pædiatric experience.

Applications, with testimonials or names of referees, to the Hospital Secretary not later than 1st July, 1957.

MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS. FIRST ASSISTANT (Registrar grade). There will very shortly be a vacancy in this grade and applications are invited from suitable candidates (salary at national scale). There is an establishment of 4 "First Assistants"—2 of Senior Registrar grade and 2 of Registrar grade. Initially the appointment will be for 1 year, renewable normally for a second year. The post is non-resident. The duties include very considerable clinical responsibility for obstetrical and gynæcological cases, including cases dealt with in the "Flying-squad" service. The supervision of House Officers and some teaching of undergraduate medical students are also involved. Candidates must therefore have had full previous experience in obstetrics and gynæcology. A higher qualification is desirable.

Forms of application may be obtained from the undersigned. The closing date is 30th June, 1957.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

MANCHESTER, 23. WYTHENSHAWE HOSPITAL. SOUTH MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade) at the above Hospital, vacant on 22nd July. Facilities are available for experience in all branches of pathology.

Applications, with full details, together with the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE OFFICER (non-tuberculous thoracic surgery) required for Manchester Regional Hospital Board Centre. Post vacant 1st July.

Application forms from Secretary.

MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) SENIOR HOUSE PHYSICIAN (pædiatrics) required for mid-August. Previous experience essential. There is a Midwifery Unit of 73 Beds and a Pædiatric Unit which includes 10 thoracic surgical beds. Recognised for D.C.H.

Application forms from Secretary.

MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (medical) at Withington Hospital.

Details of previous experience and names of 2 referees, should be forwarded immediately to the Group Secretary at the above address.

MARKET DRAYTON (near), SHROPSHIRE. CHESHIRE JOINT SANATORIUM. (305 Beds.) RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer or Senior House Officer according to experience). The post offers exceptional experience in the treatment of pulmonary tuberculosis.

Applications to the Medical Superintendent at the Sanatorium.

MEXBOROUGH. MONTAGU HOSPITAL AND ANNEXE. (198 Beds—22 obstetrics, 15 gynæcology.) Locum SENIOR HOUSE OFFICER (obstetrics and gynæcology) required immediately. Residential emoluments £150 p.a.

Applications to Secretary, Hospital Management Committee, "Fern Bank," Doncaster-road, Rotherham.

MIDDLESBROUGH. NORTH RIDING INFIRMARY (Eye, Ear Nose and Throat Centre—114 Beds.) TEES-SIDE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of Locum SENIOR HOUSE OFFICER (ophthalmology) at the above-named Hospital.

Applications, with full details, should be addressed, as soon as possible, to the Hospital Secretary.

MORECAMBE. QUEEN VICTORIA HOSPITAL. RESIDENT SENIOR HOUSE OFFICER (surgical). The post is normally tenable 1 year and the successful applicant will be attached to the specialist Surgical Unit. Post vacant now.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

NEWCASTLE REGIONAL HOSPITAL BOARD. REGISTRAR OBSTETRICIAN AND GYNÆCOLOGIST (whole-time) for Tees-side Group of hospitals—main hospital Middlesbrough Maternity (80 Beds). Post affords good obstetrical and gynæcological experience. Single accommodation available.

Applications, with the names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE REGIONAL HOSPITAL BOARD.

REGISTRAR PATHOLOGIST (whole-time), Sunderland Group of hospitals—main hospital Sunderland Royal Infirmary (312 Beds). Post available from 14th September, 1957. Married or single accommodation available.

REGISTRAR PLASTIC SURGEON (whole-time), Tees-side Group of hospitals—main hospital Hemlington Hospital (50 plastic surgical beds). Also duties at Stockton Children's Hospital (84 Beds). Single accommodation available.

REGISTRAR ORTHOPÆDIC SURGEON (whole-time), Durham Group of hospitals. Resident at County Hospital, Durham (116 Beds). Single accommodation available.

REGISTRAR ANÆSTHETIST (whole-time), Newcastle upon Tyne Group of hospitals—main hospital Newcastle General (838 Beds, including special units—i.e., neurosurgical, plastic surgery, &c.). Post recognised for F.F.A.R.C.S., available from 15th September, 1957. Married accommodation available.

REGISTRAR PHYSICIAN (whole-time) for Hartlepools Group of hospitals—main hospital Hartlepools General (213 Beds, includes 78 acute medical beds). Unfurnished flat available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of REGISTRAR in the Orthopædic Department at the Royal Victoria Infirmary. The successful candidate will be required to teach in his subject and preference will be given to applicants who have passed the Primary Fellowship examination. The appointment is for 1 year in the first instance and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details, with the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR MEDICAL REGISTRAR in the first year tenable at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance, and may be renewed to a maximum of 4 years. The appointment will be subject to terms and conditions of service of hospital medical staff in the National Health Service. In any reappointment the successful candidate may be required to undertake duty in a hospital under the Newcastle Regional Hospital Board.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.

Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Throat, Nose and Ear Department at the Royal Victoria Infirmary. The appointment is for 1 year in the first instance and is subject to Ministry of Health terms and conditions of service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the whole-time non-resident appointment of SENIOR HOUSE OFFICER (surgical) at the Royal Victoria Infirmary. The appointment will be for 1 year and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service. The salary will be at the rate of £819 10s. p.a., subject to the appropriate deductions.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS. Applications are invited for the non-resident appointment of SENIOR HOUSE OFFICER in the Department of Bacteriology. The successful applicant will assist in the general work of the laboratory, including blood-transfusion serology. Previous laboratory experience is not essential. The appointment will be for 1 year and will be subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

NORTHAMPTON GENERAL HOSPITAL. (482 Beds.) Immediate vacancy for SENIOR HOUSE OFFICER or for HOUSE OFFICER (Casualty Department), to work in conjunction with another Casualty Officer. Recognised for F.R.C.S. and (junior post) for medical pre-registration. Appointment to 30th September, 1957, or to 31st March, 1958, according to arrangement at interview.

Applications to S. C. HILL, Superintendent.

NOTTINGHAM AND MIDLAND EYE INFIRMARY. Required, SENIOR HOUSE OFFICER, duties to commence on 1st July, 1957. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications and experience, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

NOTTINGHAM. CITY HOSPITAL. (811 Beds.) Applications are invited for the post of HOUSE PHYSICIAN, vacant 25th July, 1957. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

NOTTINGHAM GENERAL HOSPITAL. Applications invited for CLINICAL PATHOLOGIST (Senior House Officer grade), duties to commence end of July. Previous experience in pathology not essential. Opportunities for training in all branches of clinical pathology are afforded in a department serving over 1200 Beds.

Applications, stating age, qualification, experience, nationality and names and addresses of 3 referees, to be sent to the Group Secretary by the end of June.

NOTTINGHAM GENERAL HOSPITAL. Resident Pre-registration HOUSE PHYSICIANS required 31st July.

Applications, stating age, qualifications and nationality, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM GENERAL HOSPITAL. Resident pre-registration or registered HOUSE SURGEONS required early June, 30th June and 31st July.

Applications, stating age, qualifications and nationality, together with copies of testimonials, to be sent to the Group Secretary.

NOTTINGHAM. HEATHFIELD HOSPITAL, Hucknall-road, NOTTINGHAM. (Infectious Diseases.) Resident Locum MEDICAL OFFICER (Male or Female) required for holiday period of 8 weeks commencing 9th July, 1957. Junior Hospital Medical Officer rate of £19 5s. per week, less residential emoluments. Previous fever experience not essential.

Applications, with copies of 2 recent testimonials, as soon as possible to Physician-Superintendent.

NOTTINGHAM. HIGHBURY HOSPITAL, Bulwell, NOTTINGHAM. Applications are invited for SENIOR HOUSE OFFICER. Obstetrical and Gynæcological Department of 41 obstetric beds, 11 gynæcological beds and a small block for puerperal pyrexia. Duties to commence on 1st August, 1957. The Hospital is recognised for the M.R.C.O.G. (obstetrics only). Previous obstetrics experience required.

Applications, stating age, qualifications, experience and nationality, together with copies of recent testimonials, to be sent to the Secretary.

OSWESTRY. THE ROBERT JONES AND AGNES HUNT ORTHOPÆDIC HOSPITAL. SENIOR SURGICAL HOUSE OFFICER (resident), required, to commence 1st July, 1957.

Apply Secretary immediately.

OXFORD REGIONAL HOSPITAL BOARD. Locum REGISTRARS in Anæsthetics required for Swindon hospitals immediately and Northampton General Hospital 1st July.

Applications, with names of 2 referees, to Secretary, 43, Banbury-road, Oxford.

OXFORD REGIONAL HOSPITAL BOARD. Registrar in Thoracic Surgery at Creaton Hospital, Northants, and in general surgery at Northampton General Hospital. His work will be divided between the 2 departments.

Applications, on forms obtainable from the Secretary, Registrars Committee, 43, Banbury-road, Oxford, should reach him by 1st July, 1957.

OXFORD. UNITED OXFORD HOSPITALS. Cowley ROAD HOSPITAL. REGISTRAR required in the above Hospital which is concerned with the treatment of acute and long-stay geriatric patients. Previous experience in this specialty desirable but not essential. Excellent training facilities for higher medical qualifications.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 30th June.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for a SENIOR HOUSE OFFICER at the Cowley Road Hospital which is concerned with the treatment of acute and long-stay geriatric patients. This post will be vacant with effect from 1st August, 1957, for 6 months in the first instance.

Applications, with names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 30th June, 1957.

OXFORD. UNITED OXFORD HOSPITALS. Applications are invited for post of NON-RESIDENT REGISTRAR to the Regius Professor of Medicine, Radcliffe Infirmary, commencing in August. This post will be for 1 year in the first instance, eligible for extension to a second year.

Applications, on forms obtainable from the Administrator, Radcliffe Infirmary, Oxford, should be received not later than 30th June, 1957.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. MATERNITY UNIT. HOUSE OFFICER required for term commencing 1st August, 1957. Applicants should preferably have held a previous hospital post.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PAISLEY AND DISTRICT HOSPITALS BOARD OF MANAGEMENT. PAISLEY I.D. HOSPITAL. HOUSE OFFICER required for Infectious Disease Unit. Post is recognised for pre-registration and becomes vacant on 1st August, 1957.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

PETERBOROUGH. THE MEMORIAL HOSPITAL AND OBSTETRIC ANNEXES. PETERBOROUGH AND STAMFORD HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON (obstetrics and gynæcology). Applications are invited for vacancy on 28th July, 1957. Busy Gynæcological Department and 54 obstetric beds. Unit consists of a Consultant, Registrar and 2 House Surgeons. Recognised for D.Obst.R.C.O.G.

Application forms from Secretary.

PLYMOUTH. SOUTH DEVON AND EAST CORNWALL HOSPITAL.

HOUSE SURGEON (pre-registration post), vacant 23rd July, 1957. Recognised for the F.R.C.S. Freedom Fields Section.

HOUSE SURGEON (pre-registration post), vacant 1st July, 1957. Recognised for the F.R.C.S. Devonport Section.

Applications, stating age, nationality, and experience, with names of 3 referees, to be sent to the undersigned as soon as possible.

F. HALL, Deputy Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

PONTYPRIDD AND RHONDDA HOSPITAL MANAGE- MENT COMMITTEE.

East Glamorgan Hospital, Church Village, near Pontypridd (316 Beds and large Outpatient Department. Committee's Base Hospital serving population of 174,000. Recognised for D.Obst.R.C.O.G., F.R.C.S., D.C.H., F.F.A.R.C.S., D.A.)

SENIOR HOUSE OFFICER (obstetrics and gynæcology), vacant on 26th June, 1957.

SENIOR HOUSE OFFICER (anæsthetics), to commence 1st August, 1957.

SENIOR HOUSE OFFICERS (medicine), to commence 1st August, 1957.

SENIOR HOUSE OFFICER (pædiatrics), to commence 1st August, 1957.

2 HOUSE OFFICERS (medicine), to commence 1st August, 1957.

HOUSE OFFICER (pædiatrics), to commence 1st August, 1957.

4 HOUSE OFFICERS (surgery) (to include duties at Porth and District Hospital), to commence 1st August, 1957.

2 HOUSE OFFICERS (obstetrics), to commence 1st August, 1957.

Llwynypia Hospital, Llwynypia, Rhondda (50 acute medical beds: geriatric beds: serving area population of 112,000)

SENIOR HOUSE OFFICER (medicine), to commence 1st August, 1957. Person appointed will have part responsibility for the Group Infectious Diseases Hospital.

HOUSE OFFICER (medicine), to commence 11th August, 1957. To also undertake duties at the Group Infectious Diseases Hospital when required.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Courthouse-street, Pontypridd.

POOLE GENERAL HOSPITAL, Poole, Dorset. (320 Beds.) BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER in Obstetrics. The post, which is recognised for the D.Obst.R.C.O.G., becomes vacant on 11th July, 1957.

Applications to the Hospital Secretary.

POOLE GENERAL HOSPITAL, Poole, Dorset. Bournemouth and East Dorset Hospital Management Committee. Locum CASUALTY OFFICER (Senior House Officer) required for the period 24th–30th June, 1957.

Applications to the Hospital Secretary.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE. Portsmouth Group of Hospitals. ANÆSTHETIST (Senior House Officer grade). Main duties at the Royal Portsmouth Hospital. Recognised for the F.F.A.R.C.S. Vacant 1st August, 1957.

Applications, stating age, experience and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

Saint Mary's Hospital, Milton-road, Portsmouth.

PORTSMOUTH GROUP HOSPITAL MANAGEMENT COMMITTEE.

Queen Alexandra Hospital (87 surgical beds)

HOUSE SURGEON (pre-registration), vacant end of June.

Chest Services of the Portsmouth Group

SENIOR HOUSE OFFICER, vacant now.

Applications, stating age, experience, and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

Saint Mary's Hospital, Milton-road, Portsmouth.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (area Accident and Orthopædic Department), vacant 1st August, 1957. Recognised for F.R.C.S. Duties including work in area Casualty Department at Battle Hospital, Reading (300 Beds). Person appointed will work with Registrar and House Officers.

Apply, stating nationality, present post, and qualifications with dates, together with names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER for E.N.T. Department, Royal Berkshire Hospital, Reading (40 Beds). Post recognised for D.L.O.

Applications, stating age, nationality, experience and qualifications, together with names of 2 referees, should be sent to Group Secretary, 3, Craven-road, Reading.

READING. BATTLE HOSPITAL. (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Accident and Orthopædic Department. Post vacant immediately. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

READING COMBINED HOSPITALS. Area Department of Obstetrics and Gynæcology. (100 Beds.) Applications are invited from registered medical practitioners for the resident post of HOUSE SURGEON to the above Department. The appointment, which is vacant on 1st July, 1957, is for 1 year, with 6 months gynæcology at the Royal Berkshire Hospital, and 6 months in the Maternity Unit at Battle Hospital. Both appointments are recognised for the Diplomas of the Royal College of Obstetricians and Gynæcologists.

Write, stating age and qualifications with dates, nationality, and present post, with copy of 1 recent testimonial, to Secretary, Royal Berkshire Hospital, Reading.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road, Redhill, Surrey. SENIOR HOUSE OFFICER (Male), mainly surgical. Post vacant immediately.

Apply to the Hospital Secretary.

REDHILL. EAST SURREY HOSPITAL, Shrewsbury-road, Redhill, Surrey. HOUSE SURGEON (Male). Appointment recognised for pre-registration training, fully-registered candidates may apply. Post vacant 16th June.

Applications to Hospital Secretary.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited from pre-registration or registered medical practitioners for the post of HOUSE SURGEON. Post tenable for 6 months as from 4th August, 1957. Recognised for F.R.C.S.

Applications, with 2 testimonials, to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

RHYL. ROYAL ALEXANDRA HOSPITAL. (138 Beds.) Applications are invited from pre-registration or registered medical practitioners for the post of HOUSE PHYSICIAN. Post tenable for 6 months as from 15th July, 1957.

Applications, with 2 testimonials, to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

ROCHDALE INFIRMARY. Senior House Officer (anæsthetics) required.

Applications, with names and addresses of 2 referees and full particulars, to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, as soon as possible.

ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.) RESIDENT HOUSE SURGEON (Male) required immediately. (Not pre-registration appointment.)

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) SENIOR HOUSE OFFICER (resident or non-resident) required for duties in the Casualty Department. Available for Male or Female applicants. This is a large General Hospital with specialised departments dealing with all types of acute medical and surgical cases. The post affords good opportunity for gaining tuition and experience.

Applications should be forwarded immediately to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

ROMFORD, ESSEX. OLDCHURCH HOSPITAL. (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit from 17th June, 1957. The service consists of 100 beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital, as soon as possible.

ROMFORD, ESSEX. RUSH GREEN HOSPITAL. (301 Beds.) GYNÆCOLOGICAL HOUSE SURGEON (Male or Female), required. Unit comprises 35 gynæcological and 6 maternity beds. Resident post open to either pre-registration applicants or to fully qualified practitioners. Appointment includes certain relief duties on the medical side.

Applications to Medical Superintendent as soon as possible. Hospital may be seen by arrangement (Tel. Romford 7711).

SALISBURY GENERAL HOSPITAL. Applications are invited for the appointment of RESIDENT HOUSE SURGEON/HOUSE PHYSICIAN to run consecutively in this order from 19th August, 1957, for a period of 6 months in each post. The post is open to pre-registration candidates.

Apply, naming 2 referees, to Group Secretary, Salisbury Group Hospital Management Committee, Odstock Hospital, Salisbury.

SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD. Radiodiagnosis. **DUNDEE TEACHING HOSPITALS.** Applications are invited for an appointment as SENIOR REGISTRAR in Radiodiagnosis at Dundee Royal Infirmary (534 Beds), the main general teaching hospital associated with the University of St. Andrews. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 22nd June, 1957.

SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD. Applications are invited for the whole-time post of REGISTRAR in Orthopædic Surgery. The main duties are at Raigmore Hospital, Inverness.

Schedules of application and further particulars are obtainable from the undersigned, with whom applications should be lodged by 24th June, 1957. A. M. FRASER, M.D.,

Secretary and Administrative Medical Officer.

Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD. Locum Tenens REGISTRAR in Surgery for duty in the Dunfermline and West Fife Hospital. Immediate vacancy.

Apply, giving qualifications and the names of 2 referees, to the Secretary, 11, Drumsheugh-gardens, Edinburgh, 3, by 22nd June.

SCOTLAND. WESTERN REGIONAL HOSPITAL BOARD. Applications are invited for the following appointments, which will be for 1 year in the first instance.

REGISTRAR in Medicine based at the Southern General Hospital, Glasgow.

REGISTRAR in Surgery based at Kilmarnock Infirmary.

REGISTRAR in Surgery based at the Western Infirmary, Glasgow, with duties for a period at the Lewis Hospital, Stornoway.

2 REGISTRARS in Surgery based at the Royal Infirmary, Glasgow.

REGISTRAR in Orthopædics based at the Western Infirmary, Glasgow.

REGISTRAR in Psychiatry for duties on a rotational basis at Bellsdyke Mental Hospital, Larbert, and at H.M. Institution, Polmont.

Applications (12 copies), stating date of birth, qualifications, experience, present appointment, and the names of 3 referees, to reach the Secretary, Western Regional Hospital Board 64, West Regent-street, Glasgow, C.2, by 29th June, 1957.

SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS. ROYAL INFIRMARY. Applications invited for the post of HOUSE OFFICER (tenable for 6 months) or SENIOR HOUSE OFFICER (tenable for 12 months) in the Department of Neurological Surgery. Vacant on 15th July, 1957. Previous experience in medical or surgical neurology welcome but not essential. Intending Physicians as well as Surgeons may apply for this post, offers wide experience in neurological methods and diagnosis. A pre-registration candidate, if successful, would be required to undertake duties in the Casualty Department.

Applications, with full details and names of 3 referees, to Superintendent, Royal Infirmary, Sheffield, 6, immediately.

SHEFFIELD. UNITED SHEFFIELD HOSPITALS BOARD OF GOVERNORS AND SHEFFIELD REGIONAL HOSPITAL BOARD. Reciprocal Training Scheme for Senior Registrars. Whole-time SENIOR REGISTRAR in Obstetrics and Gynæcology required. Initial tenure at Leicester Royal Infirmary (492 Beds). Appointment for 1 year in first instance and subject to satisfactory work and progress, renewable thereafter annually. Incumbent will proceed to the Jessop Hospital for Women, Sheffield, for the second period of the appointment in accordance with the arrangements under the Reciprocal Training Scheme.

Further details and form of application from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, 10. Forms to be returned by 24th June.

SOUTHPORT GENERAL INFIRMARY. (189 Beds. Recognised for pre-registration and F.R.C.S.)

HOUSE SURGEON (general surgery and gynæcology).

HOUSE SURGEON (general surgery and ophthalmology).

HOUSE PHYSICIAN.

Appointments vacant first half of July.

Apply, stating age, qualifications, nationality, experience, and enclosing 2 recent copy testimonials, to Group Secretary, Southport and District Hospital Management Committee, Promenade Hospital, Southport.

SOUTHAMPTON GENERAL HOSPITAL. (471 Beds.) RESIDENT HOUSE SURGEON required. Pre-registration candidates eligible.

Applications, with copies of recent testimonials, should be forwarded to Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHAMPTON. ROYAL SOUTH HANTS HOSPITAL. (278 Beds.) ORTHOPÆDIC HOUSE SURGEON required. Post recognised for Pre-registration Service and tenable for 6 months. The Hospital is the centre to which all trauma from a large industrial town and port is directed thus providing excellent experience in the treatment of traumatic conditions; patients with orthopædic conditions are also drawn from a wide area.

Applications, with copies of testimonials, should be sent as soon as possible to the Group Secretary, Southampton Group Hospital Management Committee, Bullar-street, Southampton.

SOUTHEND GENERAL HOSPITAL. Applications are invited for the post of RESIDENT GYNÆCOLOGICAL HOUSE SURGEON, vacant 10th July, 1957. The post is recognised for the M.R.C.O.G.

Applications, stating age, qualifications, and previous experience, with copies of recent testimonials, should reach the undersigned by 19th June, 1957. J. C. FIELD, Secretary.

SHREWSBURY. CROSS HOUSES HOSPITAL. (34 maternity beds.) OBSTETRIC HOUSE SURGEON (pre-registration post), vacant mid-June, 1957.

Applications, with copy testimonials, to Group Secretary, Shrewsbury Hospital Group, Royal Salop Infirmary, Shrewsbury.

SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL. Locum HOUSE SURGEON required 29th June–14th July. Pre-registration post—1 of 2.

Applications, with names of 2 referees, to Secretary.

STAFFORD. STAFFORDSHIRE GENERAL INFIRMARY. SENIOR HOUSE OFFICER (anæsthetics), Male or Female, resident. Recognised for D.A.

Applications to Group Secretary, Stafford Hospital Management Committee, 13, Foregate-street, Stafford.

STOCKPORT. CHERRY TREE HOSPITAL. (Isolation —96 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER, vacant 1st August, 1957.

Applications, stating age, experience, and qualifications, together with copies of 2 testimonials, to be addressed to the Secretary, Stockport and Buxton Hospital Management Committee, 59B, Shaw-heath, Stockport.

STOKE-ON-TRENT. CITY GENERAL HOSPITAL. (845 Beds. Recognised for F.F.A.R.C.S. and D.A.) STOKE-ON-TRENT HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER in Anæsthetics. Previous anæsthetic experience desirable, but not essential. The post offers experience in anæsthesia for all types of general surgery, thoracic and cardiac surgery, including an Obstetric Unit of 60 Beds. Staff includes a Senior Registrar who shares in emergency duties.

Applications, with copy testimonials, to the Group Secretary, Stoke-on-Trent Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE PHYSICIAN (general medicine) with dermatology. Vacant early July. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. (455 Beds.) HOUSE OFFICER (general surgery) required. Pre-registration post. Hospital recognised for F.R.C.S.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

STOKE-ON-TRENT. NORTH STAFFORDSHIRE ROYAL INFIRMARY. HOUSE OFFICER (general medicine) with pædiatrics, vacant early July. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Hospital Management Committee, Princes-road, Stoke-on-Trent.

SURBITON GENERAL HOSPITAL. (72 Beds.) King-STON GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT JUNIOR HOUSE OFFICER (surgical) which is now vacant. The post is recognised for pre-registration purposes. Duties include casualty, out-patients. Post provides interesting experience in surgery and medicine under visiting Consultants. Salary and conditions of service in accordance with the national scale.

Applications, stating age, qualifications, nationality, with copies of 2 testimonials, to the Administrative Officer, Surbiton General Hospital, Ewell-road, Surbiton, Surrey.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertfordshire. (384 Beds.) Whole-time JUNIOR HOSPITAL MEDICAL OFFICER (resident) required immediately for the gynæcological and obstetric wards.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ALBANS CITY HOSPITAL, St. Albans, Hertford-SHIRE. (384 Beds.) Locum Tenens ANÆSTHETIC REGISTRAR (resident), required from 8th July to 11th August, 1957. Post recognised for F.F.A.R.C.S. and D.A.

Applications to Secretary, Mid Herts Group Hospital Management Committee, Bleak House, Catherine-street, St. Albans.

ST. ASAPH HOSPITAL, St. Asaph. (54 obstetric beds: 23 gynæcological Beds.) Applications are invited from pre-registration or registered medical practitioners for the post of JUNIOR HOUSE OFFICER. Post tenable for 6 months from 1st August, 1957. Recognised for M.R.C.O.G. and D.Obst. R.C.O.G.

Applications, with 2 testimonials, to be sent forthwith to Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

ST. ASAPH HOSPITAL, St. Asaph. Appointment of HOUSE OFFICER. Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds) and oral surgery (4 Beds).

Applications, stating age, qualifications and experience accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

SWANSEA HOSPITAL. (413 Beds.) Glantawe Hospital MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident post of SENIOR HOUSE OFFICER in the E.N.T. Department of the above Hospital. Vacancy 1st August, 1957. The Hospital is recognised under the regulations of the F.R.C.S. (E.N.T.) and the D.L.O.

Applications, stating age, qualifications and experience, should be forwarded to the Hospital Secretary.

T. E. JONES, Group Secretary.

SWANSEA HOSPITAL, Swansea. (413 Beds.) Glantawe HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER in the Gynæcological Department at the above Hospital.

Applications, with full particulars, should be addressed to the Hospital Secretary. T. E. JONES, Group Secretary.

SWANSEA. MOUNT PLEASANT HOSPITAL. (236 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER in Obstetrics for the Maternity Unit of 40 Beds at the above Hospital. The post, which will become vacant on 11th August, 1957, is for a period of 12 months, and is recognised for the D.Obst.R.C.O.G. examination.

Applications, stating age, qualifications and experience, together with copies of 2 recent testimonials, should be sent to the Hospital Secretary not later than 28th June, 1957.

T. E. JONES, Group Secretary.

SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. SWINDON HOSPITALS. Applications invited for post of RESIDENT HOUSE PHYSICIAN in acute Medical Unit of 64 Beds at St. Margaret's Hospital. Recognised for training under pre-registration internship regulations and vacant on 5th July, 1957.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon, immediately.

SWINDON AND DISTRICT HOSPITAL MANAGE-MENT COMMITTEE. SWINDON HOSPITALS. Applications invited for post of RESIDENT HOUSE SURGEON for General Surgical Unit of 80 Beds at Victoria Hospital. Recognised for F.R.C.S. and training under pre-registration internship regulations, and vacant on 3rd July, 1957. Married accommodation available.

Full details, with names of 3 referees, to Secretary, 7, Okus-road, Swindon, as soon as possible.

WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. Locum Tenens fully registered HOUSE OFFICER required for the Gynæcological Department. £10 9s. per week. A charge at the rate of £125 p.a. made for residential accommodation.

Address written applications, giving full particulars of experience and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Pinderfields General Hospital, Wakefield.

WARWICK HOSPITAL. (320 Beds.) Pædiatric House PHYSICIAN (resident) required late July. 30-Bedded Pædiatric Unit. Post recognised D.C.H. and pre-registration.

Applications, with 2 recent testimonials, to Medical Superintendent.

WARWICK HOSPITAL. (320 Beds.) House Surgeon (pre-registration or registered candidates may apply). Good experience in general surgery. Vacant 25th July. Married quarters available.

Applications, with 2 testimonials, to Medical Superintendent.

WARRINGTON INFIRMARY. (172 Beds.) Applications are invited for the post of RESIDENT ANÆSTHETIST (Male or Female) (graded as Senior House Officer), vacant 1st July. The Hospital is recognised for the D.A. examination. Salary is £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications, stating qualifications and experience, should be sent to— HENRY L. BOOT, Group Secretary,

Warrington and District Hospital Management Committee.

c/o General Hospital, Warrington, Lancs.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) ORTHOPÆDIC HOUSE SURGEON (with certain casualty duties) required. Post recognised for F.R.C.S.(Eng.) examination. Intermediate or Senior post depending on experience for Orthopædic Unit (30 Beds). The Orthopædic Service is in charge of a Consultant and Registrar closely associated with a Postgraduate Teaching Hospital.

Applications, with copies of 2 testimonials, to the Administrator.

WATFORD, HERTFORDSHIRE. PEACE MEMORIAL HOSPITAL. (208 Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital. This is a pre-registration post and is recognised for F.R.C.S. Salary according to the National Health Service scale.

Applications, with copies of recent testimonials, to the Administrator.

WESTON-SUPER-MARE GENERAL HOSPITAL. CASUALTY OFFICER (Senior House Officer grade) required for the above Hospital. The appointment is recognised for F.R.C.S. examinations.

Applications, stating age, qualifications, and experience, together with names and addresses of 2 referees, should be addressed to Group Secretary, Weston-super-Mare Hospital Management Committee.

WEST BROMWICH AND DISTRICT GENERAL HOS-PITAL. HOUSE PHYSICIAN, vacant 1st July. Pre-registration.

Applications, with 3 recent testimonials, to Group Secretary, West Bromwich and District Hospital Management Committee, Edward-street, West Bromwich.

WEST BROMWICH AND DISTRICT GENERAL HOSPITAL. HOUSE SURGEON, vacant immediately. Pre-registration.

Applications, with 3 recent testimonials, to Group Secretary, West Bromwich and District Hospital Management Committee, Edward-street, West Bromwich.

WEST DORSET GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for 2 resident 6-monthly posts of HOUSE SURGEON (Male or Female) at :—

(*a*) Weymouth and District Hospital (124 Beds).
(*b*) Dorset County Hospital, Dorchester (109 Beds).

Both posts are recognised for the F.R.C.S. examination ; approved for Pre-registration Service, and become vacant 1st August, 1957.

Applications, stating age, qualifications, experience, and nationality, together with copies of testimonials, to the Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

WESTCLIFF HOSPITAL, Balmoral-road, Westcliff-on-sea, Essex. Applications are invited for the post of RESIDENT MEDICAL OFFICER (Senior House Officer grade). Post vacant 2nd July, 1957. The Hospital covers a wide field of medicine and offers excellent training for General Practice.

Applications should be sent to the Secretary, General Hospital, Prittlewell-chase, Southend-on-Sea, Essex, as soon as possible.

J. C. FIELD, Secretary.

WEST MALLING, KENT. LEYBOURNE GRANGE COLONY FOR MENTAL DEFECTIVES. (1521 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER required. Salary scale £852 10s.–£55–£1182 10s. a year. Appointment is subject to the terms and conditions of service for hospital medical and dental staffs and is for a period of 3 years in the first instance. Furnished or unfurnished accommodation available for married officer. Ample facilities for study.

Applications, with full details as to age, nationality, qualifications, present post, and previous experience, together with names and addresses of 2 referees, to the Group Secretary as soon as possible.

WINCHESTER. ROYAL HAMPSHIRE COUNTY HOSPITAL. (315 Beds.) SENIOR HOUSE OFFICER in the Pathological Department, vacant 16th September. Preferably resident. Duties will include training in the various branches of clinical pathology, especially hæmatology. Previous experience in clinical pathology desirable, but not essential.

Applications, with copies of 2 testimonials, to the Group Secretary.

WINCHESTER GROUP HOSPITAL MANAGEMENT COMMITTEE. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of REGISTRAR in the Department of Pathology, preferably resident. Post vacant 23rd September. The person appointed will work at the main hospital (315 Beds). Work will include all branches of pathology. Post recognised by the Examining Board in England for Diploma in Pathology.

Application forms obtainable from Group Secretary, Royal Hampshire County Hospital, Winchester.

WOLVERHAMPTON AND MIDLAND COUNTIES EYE INFIRMARY. SENIOR HOUSE OFFICER required. 100 Beds and busy Outpatient Department. Recognised for F.R.C.S. and D.O. examinations.

Applications to Secretary as soon as possible.

WOLVERHAMPTON GROUP. The Royal Hospital. JUNIOR PATHOLOGIST required. Salary in Junior Hospital Medical Officer grade. Comprehensive service offering wide experience and training. Experience in specialty not essential. Post vacant shortly. Candidates may visit Pathologist.

Applications to Group Secretary, The Royal Hospital, Wolverhampton, by 22nd June, 1957.

WOLVERHAMPTON. NEW CROSS HOSP'TAL. (634 Beds.) SENIOR HOUSE PHYSICIAN (general medicine) required immediately.

Apply to Secretary by 24th June.

WOLVERHAMPTON. THE ROYAL HOSPITAL. (An Associated Hospital of the Birmingham University Medical School.) Pre-registration HOUSE OFFICERS. Vacancies in Medicine occur on 17th and 21st July, 1957.

Please apply, with copies of 2 testimonials, to Hospital Secretary.

YORK. COUNTY, CITY, MILITARY (CIVILIAN WING), FULFORD HOSPITALS. (General Hospitals of 266, 256, 60 and 149 Beds respectively with full Consultant staff.) SENIOR HOUSE OFFICER in Anæsthetics, resident or non-resident, required from 15th July, 1957. Recognised for F.F.A.R.C.S. and D.A. Previous experience desirable but not essential.

Applications, stating age, nationality, qualifications, experience, and names of 2 referees, to Group Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

CHANNEL ISLANDS. JERSEY GENERAL HOSPITAL. Applications are invited for the post of MEDICAL OFFICER which will be vacant on 10th July, 1957, in the above Hospital. The appointment is for 6 months but is renewable for a further 6 months. Salary scale from £650 to £850 p.a., less £125 p.a. residential emoluments according to experience.

Early applications to be submitted to the President, Public Health Committee, General Hospital, Jersey, C.I.

CANADA. UNIVERSITY OF ALBERTA HOSPITAL. PÆDIATRIC RESIDENT required for 1 year commencing by 1st August, 1957, for 140-Bed children's ward in the above Hospital. Accommodation available. Remuneration $125–$175 according to experience.

Applications, stating age, qualifications, nationality, marital status, accompanied by recent references and photograph, should be forwarded by air-mail to the Superintendent, University of Alberta Hospital, Edmonton, Alberta.

IBADAN, NIGERIA. UNIVERSITY COLLEGE HOSPITAL. DEPARTMENT OF SURGERY. The Board of Management invite applications from medical practitioners with the requisite postgraduate experience and qualifications for the post of SENIOR REGISTRAR or REGISTRAR (E.N.T.) in the newly completed Hospital.

The salaries offered for the post are :—

Senior Registrar : £1428 rising by 3 annual increments to £1596 p.a. plus an inducement addition payable to an expatriate doctor of £300 p.a.

Registrar : £1164 p.a. for the first year rising to £1212 p.a. for the second year, plus an inducement addition payable to an expatriate doctor of £270 p.a.

The Senior Registrar should hold an F.R.C.S., or the Registrar a D.L.O., and be sufficiently experienced to take charge in the absence on leave of the Senior Lecturer.

The appointment will be initially for 1 tour of 12 months and will be renewable by mutual agreement, for a further tour of 12 months.

On satisfactory completion of the agreement, a gratuity of £37. 10s. will be paid for each completed term of 3 months' service.

An outfit allowance of £60 is payable on first appointment.

Partly furnished quarters are provided at a rental of 8½% of salary, excluding inducement allowance, and the officer appointed will be eligible for 7 days leave on full pay for each completed month of service in Nigeria.

Free first-class passages are provided for expatriate doctors and their wives on first appointment and on completion of their agreement. Free first-class passages to Nigeria will, in certain circumstances be provided for non-expatriate doctors. Free first-class passages will be provided on vacation leave.

Successful candidates will be eligible for children's allowance in accordance with current regulations.

Arrangements can be made to enable doctors to continue their National Health Service superannuation scheme contributions and details for the revised salary and gratuity payable in such cases will accompany application forms.

Applications should be submitted not later than 29th June, 1957, on the appropriate forms, which will be forwarded together with additional information on receipt of an addressed foolscap envelope by the Adviser on Staff Recruitment, London Office, University College Hospital, Ibadan, 57, Catherine-place, Palace-street, London, S.W.1.

U.S.A. CAMBRIDGE, MASSACHUSETTS. Applications are invited for the positions of RESIDENCIES in Anesthesia for a 2-year period beginning 1st July and 1st September, 1957. Salary $1800 first year and $3600 second year and full maintenance. Training in all branches of anesthesia. Affiliation with other hospitals.

Applications, stating age, nationality, qualifications, and experience, together with the names of their referees, should be forwarded to the Director of Anesthesiology, P.O. Box 89, Cambridge, Massachusetts. Travelling expenses to and from the U.S.A. will be paid. Particulars will be sent as soon as application is received. Please enclose recent photograph with application.

Public Appointments

DUDLEY. COUNTY BOROUGH OF DUDLEY. Assistant MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Applications for this appointment are invited from registered medical practitioners. Duties in connection with the Maternity and Child Welfare and School Health Services. Salary £1050–£1475 p.a. ; car allowance.

Applications, stating age, qualifications and experience, together with the names and addresses of 2 referees, should reach the undersigned not later than Monday, 1st July, 1957.

P. D. WADSWORTH, Town Clerk.

The Council House, Dudley, 6th June, 1957.

DURHAM COUNTY COUNCIL. Applications invited from registered medical practitioners (Men and Women) for appointment as SCHOOL MEDICAL OFFICER. Applicants must have had at least 3 years experience in the practice of their profession. Salary scale £1050–£50–£1200–£55–£1475 p.a.

Further details and form of application from undersigned. Completed applications by 22nd June, 1957.

G. H. METCALFE, Director of Education.

Shire Hall, Durham, 27th May, 1957.

KERRY COUNTY COUNCIL. Surgical Registrar required. Applications are invited for the whole-time non-pensionable post of Registrar at the co. Hospital Tralee. Candidates must be between the ages of 24 and 40 on 1st July, 1957, and must have had 3 years experience (including 2 years satisfactory surgical experience) since qualification.

Application forms and full particulars may be had from the Secretary, Kerry County Council, Killarney, by whom applications will be received not later than Tuesday, 2nd July, 1957.

T. O'SULLIVAN, Acting County Secretary.

County Council Offices, Killarney, 5th June, 1957.

THE MEDICAL SERVICE OF THE ROYAL NAVY

VACANCIES FOR MEDICAL OFFICERS

Candidates are invited for Short Service Commissions of 3 years, on termination of which a gratuity of £600 (tax free) is payable. Ample opportunity is granted for transfer to Permanent Commissions on completion of 1 year's total service. Officers so transferred are paid instead a grant of £1500 (taxable).

All entrants are required to be British subjects whose parents are British subjects, medically qualified, physically fit, and to pass an interview.

Full particulars from the Admiralty Medical Department, Queen Anne's Mansions, St. James's Park, London, S.W.1.

FACTORY DOCTORS. Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

District	*County*	*Latest date for receipt of applications*
WOMBWELL	YORK	29TH JUNE, 1957

GLOUCESTERSHIRE COUNTY COUNCIL. Assistant COUNTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Must be registered medical practitioners. Possession of a Diploma or Certificate in Public Health an advantage. Salary £1050–£1475 p.a. Superannuable : medical examination. Car driver and should possess a motor-car.

Application forms obtainable from County Medical Officer of Health, Berkeley House, Berkeley-street, Gloucester, returnable by 29th June, 1957.

GUY H. DAVIS, Clerk of the County Council.

LAGOS TOWN COUNCIL, Nigeria. Assistant Maternity AND CHILD WELFARE OFFICER required on contract for 5 years in first instance. Salary scale (including inducement allowance) £1170, rising to £2118 a year, plus Staff pay £100 a year. Commencing salary according to qualifications and experience. Free passages for Officer and wife. Assistance towards cost of children's passages and grant up to £150 annually towards maintenance in United Kingdom. Liberal leave on full salary after each tour of 12–24 months. Outfit allowance £60 usually payable. Candidates must be registered medical practitioners and should preferably have postgraduate experience and/or training in obstetrics.

Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M3/43058/LD.

MIDDLESEX COUNTY COUNCIL. County Health DEPARTMENT. ASSISTANT MEDICAL OFFICER (whole-time) required initially in Area No. 9 (Heston and Isleworth, Southall, Brentford and Chiswick). Duties include supervision of health of school-children, mothers and young children, attending health clinics and routine medical inspections at schools. Experience in these branches of public health work an advantage. Salary £1050–£1475 p.a. Established, pensionable, subject to medical assessment and prescribed conditions.

Apply, stating age, qualifications, experience, and names of 2 referees, to Area Medical Officer, 92, Bath-road, Hounslow, by 29th June (quote V.314TL). Canvassing disqualifies.

NOTTINGHAM. CITY OF NOTTINGHAM. Health SERVICES. Applications invited for appointment of ASSISTANT MEDICAL OFFICER for duties which will include maternal and child health and vaccination and immunisation. Possession of the D.P.H. an advantage. Post superannuable subject to medical examination. Salary £1050–£1475 p.a. Commencing salary according to local government experience.

Application forms to be obtained from Medical Officer of Health, Huntingdon-street, Nottingham, and to be returned to him by 18th June, 1957. T. J. OWEN, Town Clerk.

SOUTHPORT. COUNTY BOROUGH OF SOUTH-PORT. Applications are invited from registered Male or Female medical practitioners for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH AND DEPUTY SCHOOL MEDICAL OFFICER. Applicants should possess a Diploma in Sanitary Science, Public Health or State Medicine and should have had experience in a health department. Salary scale £1269–£55 (4)–£50 (1)–£1539, plus travelling allowance on a mileage basis.

Application forms and conditions of appointment may be obtained from the Medical Officer of Health, 2, Church-street, Southport, to whom applications should be sent to arrive not later than 1st July, 1957, with envelopes endorsed "Deputy Medical Officer of Health" in the top left-hand corner.

R. EDGAR PERRINS, Town Clerk.

THE NIGERIAN RAILWAY CORPORATION invites applications for the post of MEDICAL OFFICER.

Maximum salary £1600 p.a. plus overseas pay £300 p.a.

Qualifications : Candidates must be legally qualified medical practitioners registered to practise in Great Britain. Additional postgraduate medical qualifications and medical administrative experience, preferably in the tropics, desirable but not essential.

Duties : The person appointed will be required to work as Medical Officer at a Railway District Hospital and/or Dispensary and to be responsible to the District Medical Officer for the medical and surgical care of the staff of the Corporation and their families, with such administrative and public health duties as pertain to effective Railway working.

Tours : 15-month tours, followed by 15-week leave in U.K. on full pay.

Allowances : In addition there are attractive allowances.

Apply to the London Representative, Nigerian Railway Corporation, 11, Manchester-square, London, W.1.

General Practice

***For an Executive Council post** (England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."*

BRISTOL EXECUTIVE COUNCIL. Applications invited to fill a general medical practice VACANCY which will arise on 31st August, 1957, urban. List at present approximately 2000. Surgery accommodation may be available. Short-listed candidates will be interviewed on 2nd July, 1957. Apply before 21st June, 1957, on Form E.C.16A, obtainable on application to the Clerk, Bristol Executive Council, 5, Alexandra-road, Bristol, 8.

KIDDERMINSTER, WORCESTERSHIRE. Urban VACANCY due to resignation on 24th August, 1957 (approximately). List 2721. Residence not available. Surgery may be available. Closing date 22nd June, 1957. E.C.16A and full written details from the Clerk, Worcestershire Executive Council, 29, Foregate-street, Worcester.

STOCKWOOD ESTATE (BRISTOL). Applications are invited for a General Medical Practice VACANCY in the Sturminster-road area of the Stockwood Housing Estate which will arise on 1st October, 1957. There is no list but the successful applicant will be granted the Initial Practice Allowance, if eligible. The housing authority has contracted for the erection of 526 dwellings due to be completed by October, 1958, and it is anticipated that a total number of 900 new dwellings will ultimately be erected. Temporary residential and surgery accommodation will be available to the successful applicant and later permanent accommodation, if required. Apply before 6th July, 1957, on Form E.C.16A, obtainable from the Clerk, Bristol Executive Council, 5, Alexandra-road, Bristol, 8.

WOMBWELL, near BARNSLEY. Applications are invited for VACANCY (urban). List at present approximately 2800. Residential and surgery accommodation available for purchase. Apply on Form E.C.16A to the undersigned, from whom further particulars may be obtained, not later than 22nd June, 1957.

C. H. STABLER, Clerk, West Riding Executive Council.
5, St. John's-north, Wakefield.

Hospital Services : Non-Medical Appointment

MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY. Applications are invited for the post of MEDICAL PHOTOGRAPHER or SENIOR I (dependent on qualifications) with effect from 1st July, 1957. Salary scales £440–£545 p.a. or £515–£665 p.a. respectively.

Applications, with names of 2 referees, to Director, Department of Medical Illustration, Manchester Royal Infirmary, Manchester, 13.

Miscellaneous

Steel, Peech & Tozer, Branch of the United Steel Companies Ltd. Applications are invited from registered medical practitioners for the post of Assistant Medical Officer at the above Steelworks near Sheffield. Candidates should be aged about 30 and have a good clinical background, preferably with some experience in industrial medicine, and have completed their National Service commitments. The successful candidate would be expected to work under the general direction of the Works Medical Officer. Commencing salary according to current B.M.A. scale.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent to the Works Medical Officer, Messrs. STEEL, PEECH & TOZER, The Ickles, Sheffield, 1.

Pharmaceutical Industry. Bayer Products Limited require a Doctor with a good scientific background (organic chemistry, pharmacology, bacteriology or pharmacy) or other suitably qualified person for research liaison work. As the position will involve considerable Continental travel, a knowledge of a European language is essential. The successful applicant will also be concerned with the evaluation of new drugs in Britain. The work is interesting, adequately remunerative and has good prospects in a rapidly expanding organisation. —Applications in confidence to the Managing Director, BAYER PRODUCTS LIMITED, Neville House, Eden-street, Kingston-on-Thames, Surrey.

Tanganyika. Medical Officer urgently required for Catholic Mission hospital. D.T.M. not essential.—Particulars from Dr. L. D. STIRLING, 17, Kensington-court, London, W.8.

Locum wanted for Medical Superintendent, St. Lucy's Hospital, St. Cuthbert's Mission, Tsolo, Cape Province, from 1st March to 1st October, 1958. Duties comprise average 150 inpatients, daily outpatient service of approximately 30 patients. Applicant must have had 4 years experience, have a knowledge of obstetrics, anæsthetics, X-ray interpretation and emergency surgery. Salary (including cost-of-living allowance) £1200, plus £100 for each child. Rent-free house available. Nearest junior school 8 miles, senior school 40 miles. If applicant suitable and wishes, permanent post on staff might be considered.—Replies to Dr. VAN DER WALT, St. Lucy's Hospital.

Medical Writing. Bayer Products Limited require a Man or Woman with medical or pharmaceutical knowledge and ability to write good English for medical literary work. Work is varied, interesting, and has good prospects.—Applications in confidence, with specimens of any written matter which will be returned, to Personnel Officer, BAYER PRODUCTS LIMITED, Neville House, Eden-street, Kingston-on-Thames, Surrey.

"Pregnancy Diagnosis by the Xenopus Method," 24-hour service. Send specimens of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

Applicants for posts requiring testimonials copied or duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

Typewriting and Duplicating. First-class work at moder-ate prices by experienced medical typists. Electric machines —SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

The British Journal of Medical Hypnotism. Quarterly, £1 1s. p.a.—Orders to the publishers, 4, Victoria-terrace, Hove, 3, Sussex.

For sale, 3 Ringlebs Cystoscopes in good order, £10 each: can be inspected at St. Peter's Hospital, Chertsey, Surrey.—Apply : Administrative Officer (Phone : Ottershaw 441).

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